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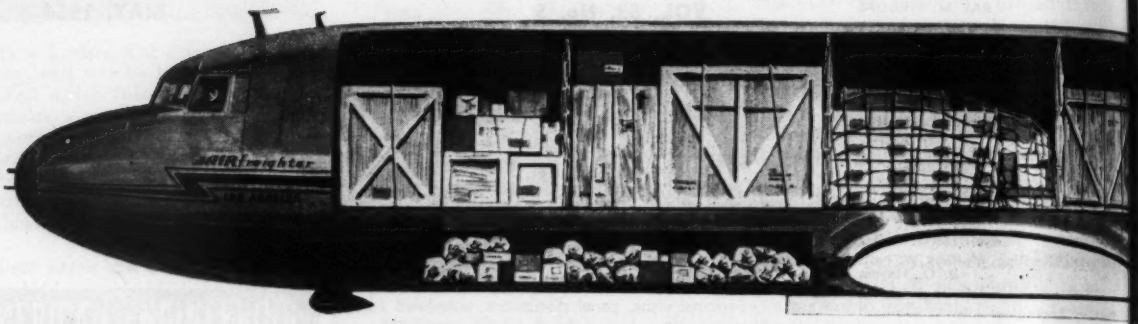
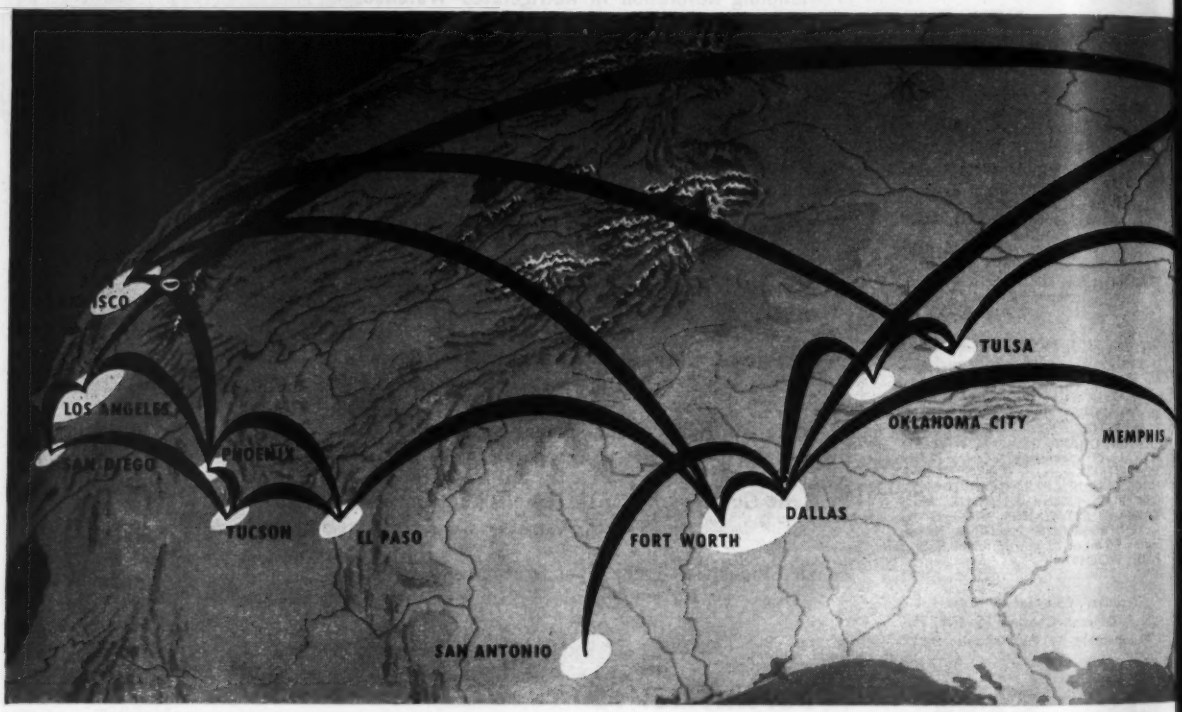
We've got the right SPACE

American Airlines has the greatest capacity in the
—more planes carrying freight to more places





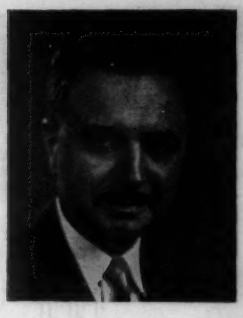
Capacity, of course, is one measure of a carrier's ability to deliver the goods. That's why it's important for you to know American Airlines has the greatest cargo capacity in the airfreight field.

But, equally important, when it comes to specifying a carrier, is the availability of that space—having it where and when it can best serve you. Here again, American leads all others.

• While providing fast and frequent service to seventy-seven key cities throughout the Country, *only American serves two-thirds of the top thirty retail markets—all twenty-three of the leading industrial states.*

Add this to American's superiority in expe-

On the Line—



Recession Casualties

ONE day, recently, we talked to a president of a fairly large company who made this remark: "I never worry about details. I just give orders. It is up to my men to worry about the details."

That may be good under the right circumstances. But it can work hardships. Here's a sorry example:

A Traffic Manager of another company was told that because of poor business conditions, there would have to be some retrenchments. He was to cancel some greatly needed equipment that was ordered for the shipping room. Three months later, January, 1954, he was told to reduce his staff by one man.

The big boss was, of course, worried by business conditions. The first method he thought of was to cut expenses, which resulted in episodes, as quoted above, all throughout the plant. Apparently the big boss didn't care about how the various departments were going to manage. The details were up to the department heads.

In the case of the Traffic Department, the effect was serious. The staff worked unreasonably hard; bodies, minds and nerves were in poor condition. No matter how hard they tried, they always were behind. Errors increased, morale got a setback.

As things turned out, business didn't go into the bad slump that was anticipated by the big boss. But it will take a long time before things are back to normal in the Traffic Department—and in the other departments, if this case is typical.

The Traffic Manager is in the hospital with a bad case of ulcers. Two clerks quit. They have been replaced with willing but inexperienced help. The department's business is in a sad state of confusion.

The moral to this incident is quite plain. But we wonder if the boss will see the point. What happened in the Traffic Department probably is just a matter of details which he won't bother to consider.

But the Traffic Manager is not without some blame. There was no need to almost destroy himself because of an unreasonable order. There was no need to put such great pressure on his staff to cause people to quit. That didn't solve the problem.

He should have supplied the big boss with a weekly or daily report on conditions. At the end of each report there should have been this sentence: "As soon as you determine that conditions warrant the return to our original program, the business of this department can be restored to greater efficiency."

No boss, big or little, can ask for more.

Yakkety Yak

Big men don't necessarily have big intellects.

. . . The strong and silent types have their moments of weakness. They just don't advertise.

. . . TEAMSTERS' TEARS: Profit-taking investors seldom gripe, but Dave Beck, whose well heeled ($32 million), heaving-investing union chalked up $340,000 in profits in the stock market in the first quarter of '54 cried that "we are in a very serious recession."

. . . He chided big business for lack of courage and leadership in launching new projects and for not pursuing business promotion in general.

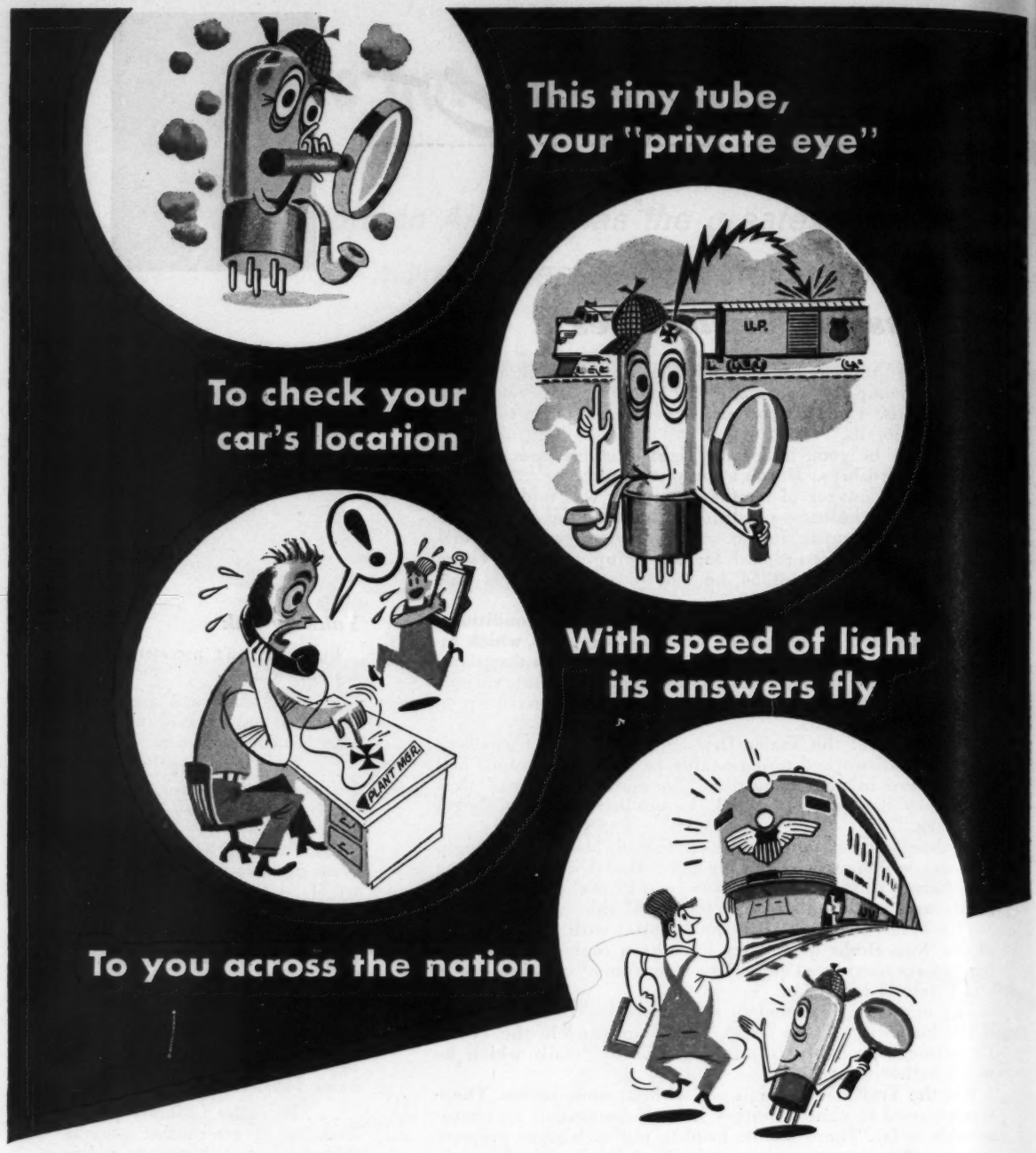
. . . He reproached the Republican Administration for its "economic blunders."

. . . He called for heavy private financing of construction projects from hotels to toll roads with federal financial support.

. . . He inferred lack of agreement with fellow unionists seeking better wages, hours and conditions by stating "unless a business is profitable, it cannot pay an adequate return."

H. V. Greene

Editor



Among America's most progressive industries are the railroads. For instance, take the postwar advances in tracing. On Union Pacific, the location of your freight shipments are tabulated in an amazing system of punch cards and teletype machines, which electronically report directly to Union Pacific offices across the nation.

Your shipments can be pinpointed as they move, helping you to quickly work out your distribution problems through your Union Pacific representative.

UNION PACIFIC RAILROAD

(Offices in 70 cities throughout U.S.A.)

UNION PACIFIC RAILROAD

Circle No. 6 on Card, Page 35, for more information

Chuting the NEWS

Coming Events

May 4-5—Fifth Highway Transportation Congress, Washington, D. C.
May 5-8—Chain Store Traffic League, Annual Convention, Louisville, Ky.
May 6-7—Atlantic States Shippers Advisory Board, Atlantic City, N. J.
May 6-8—National Tank Truck Carriers, Inc., Conference of ATA, 6th Annual Convention, Cincinnati, Ohio.
May 10-12—Central Western Shippers Advisory Board, Salt Lake City, Utah.
May 16-19—American Railway Development Assn., 45th Annual Meeting, Salt Lake City, Utah.
May 16-19—Grocery Distribution Exposition, by U. S. Wholesale Grocers' Assn., St. Louis, Mo.
May 17-21—34th Annual Conference, Canadian Warehousemen's Association, Montebello, Quebec.
May 18-20—Assn. of Interstate Commerce Commission Practitioners, Annual Meeting, Boston, Mass.
May 18-20—Western Traffic Conference, Annual Convention, Hollywood, Cal.
May 19-20—National Traffic Committee of the Trucking Industry, Washington, D. C.
May 24-27—6th Annual Meeting, Terminal Operators Council, ATA, Hotel Sheraton, St. Louis, Mo.
May 25—Southwestern Industrial Traffic League, Amarillo, Tex.
May 25-26—National Rivers & Harbors Congress, 41st Convention, Washington, D. C.
May 25-27—Southwest Shippers Advisory Board, Amarillo, Tex.
May 29-June 2 — National Freight Traffic Assn., Spring Meeting, White Sulphur Springs, W. Va.
June 8-9—Packaging and Materials Handling Institute, University of Southern Cal.
June 9-19—Mechanical Handling Exhibition & Convention, London, England.
June 21-24—National Freight Claim Council of American Trucking Assns., Inc., St. Louis, Mo.
June 23—American Trucking Assns., Inc., Annual Motor Carrier Shipper, Carrier-Receiver Meeting and Banquet, St. Louis, Mo.
June 23-24—Great Lakes Regional Advisory Board, Traverse City, Mich.
July 6 — Texas Industrial Traffic League, Annual Meeting, San Antonio, Tex.

Spatta Predicts 'A Bright Future' For The Materials Handling Industry at MHI Meeting

George Spatta, president of Clark Equipment Co., sounded a note of optimism for the materials handling industry April 13. Spatta spoke at the Annual Spring Meeting of the Material Handling Institute, in Chicago, Ill.

Calling for bigger production of lift trucks, he said the industry could produce 50,000 such trucks annually, compared to the present 20,000 production figure.

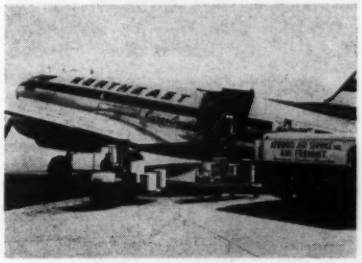
He warned, however, that the biggest job facing the industry today is selling. The industry must promote its products, he said, and must do a better job of salesmanship.

—DA—

Record Revenue

A record operating revenue of $19,092,491.17 during 1953 was reported by James D. Edgett, president, North American Van Lines. Net earnings of $289,485.71 after federal taxes also hit new high.

All Cargo Service



Northeast Airlines Inaugurates All Airfreight Service: On April 1 Northeast Airlines inaugurated all cargo service in the New England states with this new C-46F Cargoliner. Regular service to New York-Boston; Portland, Me.; Manchester, N. H., and Worcester, Mass., is offered

Walter E. Schirmer, chairman of the Exposition Committee, discussed the growth of local shows; and E. W. McCaul, chairman of the Cooperation Committee, outlined progress of the Traveling Clinic program.

Other committee reports and their chairman included: Industry Service, C. H. Strauss; Industry Education, D. H. Bitney; College-Industry, Howard M. Palmer, and AAR Cooperation, John G. Bucuss.

C. B. Elledge, MHI president, said the committee reports and discussions served as a reappraisal of the Institute and its programs.

—DA—

Wirebound Box Group Elects N. A. Fowler

N. A. Fowler, director of sales and research for General Box Co., has been elected president of the Wirebound Box Manufacturers Assn. He is former chief of the Packaging Branch of the Army Ordnance Corps, and during the early days of the Korean War served as chairman of the Munitions Board Packaging Industry Advisory Committee.

—DA—

Milton C. Sarran has been elected president of the Southern Chapter, American Steel Warehouse Association.

(*Please Turn Page*)

Chuting the News

(Continued from Preceding Page)

'Blueprint for Adequate Roads' Panel Topic At Fifth Highway Transportation Congress

"How Do We Blueprint for Adequate Roads?" will be the topic of a four-man panel discussion scheduled for the Fifth Highway Transportation Congress in Washington, D. C., May 4-6.

Arthur C. Butler, director of the National Highway Users Conference, sponsoring group, has announced a complete program for the Congress. The keynote address will be delivered by Albert Bradley, NHUC chairman and executive vice president of General Motors Corp.

The adequate roads panel will deal with road problems at both state and county levels. William S. Canning, Keystone Automobile Club, will moderate the discussion.

The opening day will be devoted to committee meetings on programming, finance, planning, taxation, engineering, administration, uniform laws, highway barriers and safety.

Other panels scheduled include: "How United Are The United States?" moderated by Amos E. Neyhart, of Penn State's Institute of Public Safety, and "The City Traffic Muddle—What Exit?" moderated by William S. Lampe, editor, Hearst Better Roads Campaign.

—DA—

New AWA Members

The following new memberships are announced in the AWA, Merchandise Division: E & R Cartage and Storage Co., Cleveland, O.; Calumet Harbor Terminals, Inc., Chicago, Ill.; Western Warehousing Co., Chicago, Ill., and the Oklahoma City and Tulsa, Okla., branches of General Warehouse Corp., Springfield, Mo.

—DA—

Warehouseman President Of National Chamber

Clem D. Johnston, former owner of the Roanoke (Va.) Public Warehouse, and chairman of Project Adequate Roads, has been elected president of the Chamber of Commerce of the United States. Although Johnston has leased the Roanoke warehouse, he still operates a 450-acre beef cattle farm, has interests in six wholesale groceries, and is a director in several other companies.

Warehousing Study

Students Visit Terminal Piers: These young men, shown with C. J. Grimley, vice president and general manager of Wiggin Terminals, Inc., recently visited Wiggin's Terminal Pier, in Charlestown, Mass. All students at Babson Institute, the men were studying warehouse facilities

—DA—

NYC Piggy-Back

The New York Central System will start "in a few months" to haul motor common carrier highway trailers on flat cars, and will build new terminals for this service in five cities, William White, president, announced April 18.

Central's engineers now are completing plans for terminals to be constructed at Chicago, Cleveland, New York, Boston and Detroit.

Reinforced Belting

Iron Ore Conveyor Belt Gets Test Run: What looks like an ordinary industrial conveyor belt, actually has high-tensile steel cables imbedded in rubber to withstand the strain of conveying thousands of tons of iron ore at the Pennsylvania Railroad's new pier in Philadelphia. B. F. Goodrich belt will carry 3,600 tons an hour more than a quarter mile from ocean-going freighters to freight cars

Traffic Items

William H. Ott, Jr., general traffic manager, Kraft Foods Co., Chicago, Ill., reelected president, Illinois Territory Industrial Traffic League.

Application and Use of Materials Handling Equipment to Shipper and Carrier Operations was the theme of a joint meeting of the **Newark, N. J. Chapter, Delta Nu Alpha** and the New Jersey Chapter of the **American Materials Handling Society**, on April 26.

O. H. Osborn, GC&SF Railroad, spoke on Loss and Damage at the April meeting of the **Traffic Club of Houston.**

George M. Schifferdecker, Western Electric Co., spoke at the April meeting of **NYU Chapter, Delta Nu Alpha.**

Wade Sherrard, Motor Truck Association of California, addressed the Annual Truck Night meeting of the **Southeast Traffic Club of Los Angeles** on April 15.

Jeremiah J. Sullivan, chief of the Bureau of Cargo Security, Port of New York, spoke on Pilferage at the Better Shipping Night meeting of the **Traffic Club of Eastern Connecticut** on April 22.

John W. Hartzell, general freight agent, B&O Railroad, is the new president of the **Traffic Club of Philadelphia.**

Take-It-Or-Leave-It

Take-It-Or-Leave-It Pallets and Waxed Forks Do the Job: Loading a 30-ton freight car with 50-lb paper bags of feed, without pallets, in 90 minutes is an easy job with this unique system. Pallets are constructed so that forks can be inserted under the pallet, or directly under the load, leaving the pallet behind. Forks are kept polished and waxed to facilitate exit

Little Retires From AWA

Wilson V. Little, executive secretary of the American Warehouseman's Assn. since Jan. 1, 1926, retired on May 1st.

Donald E. Horton, assistant executive secretary for the past eight years, is the new executive secretary, and Allen D. Walters, assistant executive secretary.

In 1951, Little was awarded an honorary life membership in the AWA, Merchandise Div., in recognition of his 25 years of service.

—DA—

The Los Angeles Traffic Managers Conference has changed its name to Traffic Managers Conference of Southern California, and has increased the number of directors from 12 to 15.

Carrier Conference Files Piggy-Back Petition

"Trailer on flatcar service of the nation's railroads should be made freely available to all shippers whether they use common carrier or private motor carrier units."

That was the position of the Private Carrier Conference, Inc., of the American Trucking Associations, in comments filed last month with the ICC in the so-called "Piggy-Back" proceeding docketed as No. 31375.

The statement declares that to adopt a conclusion that the railroads could offer trailer on flatcar service to motor common carriers exclusively would not only be basic and illegal departure from the no-discrimination standard of the U. S. Supreme Court, but would also "deprive shippers of their right to choose freely the form of transportation they most desire to use."

—DA—

Railroad Revenue Freight Car Loading

		1954	1953	1952	1951
January	(5 wks.)	2,967,321	3,351,041	3,561,719	3,660,523
February	(4 wks.)	2,461,745	2,730,301	2,911,090	2,834,472
March	(4 wks.)	2,411,835	2,801,445	2,867,583	2,998,963
April	(4 wks.)	.....	2,957,088	2,912,199	3,152,198
May	(5 wks.)	.....	3,883,088	3,677,596	3,977,393
June	(4 wks.)	.....	3,203,942	2,605,738	3,294,766
July	(4 wks.)	.....	2,963,805	2,236,068	2,993,321
August	(5 wks.)	.....	4,022,382	3,882,089	4,120,219
September	(4 wks.)	.....	3,153,226	3,363,834	3,311,848
October	(5 wks.)	.....	4,024,439	4,156,014	4,316,505
November	(4 wks.)	.....	2,796,888	3,139,489	3,138,884
December	(4 wks.)	.....	2,413,396	2,671,756	2,700,094
Total		7,840,901	38,302,762	37,985,155	40,499,182

Merchandise Mart

Fisher G. Dorsey, Houston, Tex., announces the opening of the Houston Merchandise Mart, modern new storage and merchandising building in Houston. Dorsey also is president of Patrick Transfer and Storage Co., Patrick Shipside Warehouse at Port Houston, Union Transfer and Storage Co., Bluebonnet Freight Forwarding Co., and Federal Rigging Co.

—DA—

JETAC First Quarter

The Joint Employment Transportation Advisory Council, which is affiliated with the Traffic Clubs of New York, and New Jersey, announced that it has placed 22 applicants in various positions in the Metropolitan Traffic Field without cost to applicant or employer during the quarter ending March 31.

—DA—

ATA's Council of Safety Supervisors and Equipment and Maintenance Council will meet simultaneously in Cincinnati, O., May 10-13.

The Canadian Industrial Traffic League at its recent 38th Annual General Meeting created a Private Motor Truck Committee.

—DA—

Director of Storage

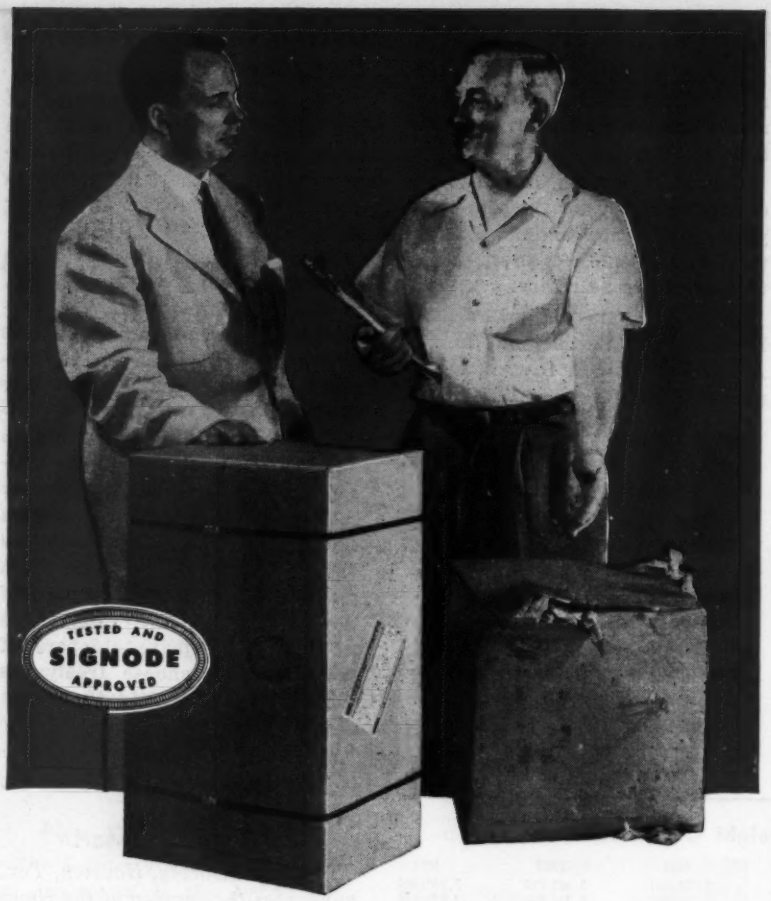
Appointment of Albert B. Drake, founder and former president of the Lehigh Warehouse and Transportation Co., Newark, N. J., as director of storage, distribution and disposal, effective April 1, has been announced by Charles S. Thomas, assistant secretary of defense (Supply and Logistics).

Materials Handling Show

Methods of materials handling where rail shipments are involved will be among the specialized problems emphasized in the Fifth Western Packaging and Materials Handling Show, in San Francisco, Cal., Aug. 17-19.

—DA—

The Minnesota-Northwest Warehousemen's Assn. conducted its 44th Annual Meeting April 22. April 8 was the date of the Semi-Annual Meeting of the Wisconsin Warehousemen's Assn.



Why spare the strap and spoil the sale?

Here is a scene all too familiar to distributors, dealers and customers. Valuable merchandise that has arrived damaged and unsalable.

Why? Because somebody gambled customer good will against the cost of a few cents worth of steel strapping?

Ask any freight agent or claim adjuster. They'll say that steel-strapped containers more than pay their own way—in the reduction of shipping losses, protection of your company's reputation, and added insurance of continued sales.

Ask any Signode fieldman and he'll tell you it's easy to apply steel strapping . . . efficiently and economically . . . by hand tools or by power strapping machines. For complete information without obligation and a copy of our folder 6 BASIC WAYS OF UNITIZING, write

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LETTERS
TO THE EDITOR

Destruction Stockpiling

To The Editor:

We are very much impressed by your April article, "Stockpiling for Destruction." We conduct a course in Wholesale Executive Management at Ohio State University each spring. Are reprints available for use in connection with this course?

Paul H. Bolton
Executive Vice President
National Association of Wholesalers
Washington 6, D. C.

The article mentioned by Mr. Bolton was authored by J. T. W. Babcock, assistant chief engineer, Factory Insurance Association. A limited supply of extra copies of the April issue are available.—Ed.

Apple Handling

To The Editor:

Can you tell us where to get information concerning the movement of packed bushel baskets of apples from cold storage rooms to trucks and rail cars, and what equipment is used beside the conventional hand truck?

South Haven Fruit Exchange
South Haven, Mich.

A recent government study of apple handling methods in the Pacific Northwest indicates that equipment in use for this purpose, in addition to the conventional hand truck, includes clamp type two-wheel hand trucks, the same trucks in combination with belt conveyors, floor chain conveyors, and a variety of lift and fork trucks. Copies of the 302-page book are available at $1.50 each by writing the Government Printing Office, Washington 25, D. C. Ask for Marketing Research Report No. 49, "Apple Handling Methods and Equipment in Pacific Northwest Packing and Storage Houses."—Ed.

Expendable Pallets

To The Editor:

We are in the process of making a detailed study of the handling of our paper products by disposable pallets. We are gathering information from various sources in this initial phase, and any detailed or descriptive literature, help or suggestions which you may be able to offer will be greatly appreciated.

Robert L. Eller
Marketing Research Dept.
Scott Paper Co.
Chester, Pa.

A list of major expendable pallet manufacturers appears on Page 94 of the Where-To-Buy-It Directory in the February issue of DISTRIBUTION AGE. *All makers listed have indicated*

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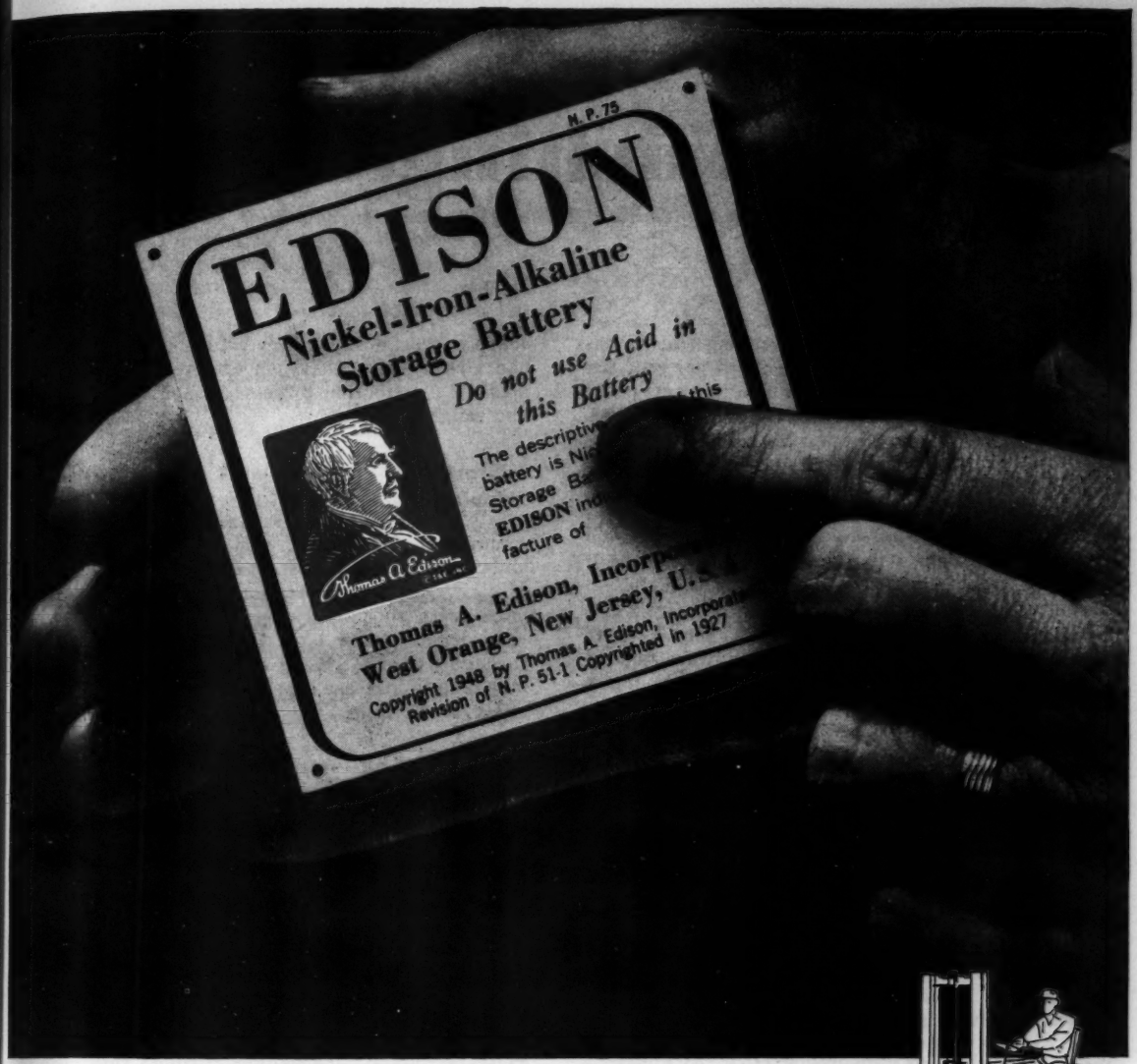
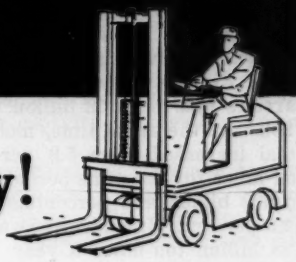


The big difference in battery economy!



The battery economy you gain from Edison begins with the design and function of the battery itself. Edison Batteries are of steel cell construction—with plates, and containers of steel. They employ an alkaline electrolyte. This electrolyte actually preserves the steel plates within the cell.

What does this mean to you in industrial truck operation? Simply the economy of *more than twice the service life* in battery operation . . . as well as an operating dependability that can't be matched!

Why not profit today from a complete explanation of Edison's many unusual battery features and the basic economies they provide to industrial truck operations? Send for Bulletins 2039 and 3808. To request a visit from the Edison field engineer in your area, simply write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, New Jersey.

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EDISON
Nickel · Iron · Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

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Washington DA

From the Chilton Washington News Bureau Staff

Transport Taxation Efforts by the transportation industries to have the 3 per cent tax on transportation of property and goods eliminated were evidently too little and too late. But a cut of one-third was voted in the transportation tax of persons. It was dropped from 15 to 10 per cent. Excise tax rate on trucks, automobiles, motorcycles, parts and accessories will stay at the old level until April 1, next. The 2 cents-a-gallon tax on gasoline and diesel fuels will remain in effect, so will the 6 cents-a-gallon tax on lubricating oils.

Commercial vs Government It looks as if GSA may have to seek more commercial warehousing, if the new White House policy is adopted and the stockpiling program expands. The agency says it needs more warehouses, has them all planned. But Congress is reluctant to allot substantial sums for the purpose, isn't convinced GSA is making use of all available government space. Argument by GSA is that government space, especially as to combustibles, is cheaper than rentals—something like $4.50 per ton-year against average commercial cost of $10.42.

Transport Pie-Cutting Motor carriers are cutting deeper into the freighting business. A study by the Bureau of Transport Economics shows a steady increase from 1944 through 1952. Figures show the total ton-miles by highway carriers rose from 58 billion in 1944 to 184 billion in 1952. At the same time, motor freight share of the total increased from 5.3 per cent to 16.2. Railroad ton-miles for the same period dropped from 734 billion to 623 billion and percentage decreased from 71.2 to 54.9 per cent. Inland waterways are now transporting 168 billion ton-miles a year and pipelines about 157 billion. Airlines carry 414 million ton-miles.

Facilities & Plants There's no sign of a down-turn in either construction or capital spending in 1954. The federal government now foresees this year's investments in new plants and facilities and equipment as running close to 1953's record of $28.4 billion. About $27 billion actually has been planned so far and new programs could push total well above last year. Railroads plan to spend less, but automotive and other transport equipment manufacturers will spend more.

Parcel Post Weights & Sizes It looks as if parcel post weights and sizes may go back up to former limits. Post Office Department itself is now in favor, has recommended that Congress repeal Public Law 199 which cut sizes and weights sharply. Postal support may turn the tide. Pressure had already been heavy on Congress from nearly all fields of distribution to have former permissible sizes and weights restored.

Military Shipping Government cost accountants are to look into military shipping costs—at the request of a House subcommittee. Specifically, the subcommittee wants to know how much it costs to ship military cargo by Military Sea Transportation Service vessels as compared with subsidized cargo vessels operated by private firms. There is a suspicion that any savings through use of MSTS, if chartered space is available, may tend to increase subsidy costs and thus more than offset any savings.

Freight Car Stockpiling Government officials for the first time are studying the feasibility of buying and stockpiling railway freight cars. Present Class I ownership total is about 1,717,000 units, sufficient to meet current transport needs. Defense officials set the security minimum at 1,867,000. Railroads say they will have to get along with a much slower rate of acquisition than defense officials advise. They plan to cut overall capital spending this year by $350 million.

Packaging Outlook There'll be more container and packaging business this year than last if government experts are right in their analysis. Based on reports by the industry so far, showing business better than last year, they say there will be more usage in 1954 than in record-breaking 1953. One reason is that water was squeezed out of inventories in late 1953, clearing the way for a firmer order foundation and potential new order upsurge.

Federal Fleet Government ownership of motor vehicles as of last June 30 is reported as standing at approximately 261,000. Of this number, roughly 177,000 are trucks with the largest portion, about 112,000, in possession of the Defense Department, leaving 65,000 under operation of the federal government's 55 civilian agencies. By far and large the greater portion consists of 1-ton or less in type, this group accounting for close to 104,000 of the total—with 60,000 under operation of the military services. General Services Administration, the government's housekeeper, figures it should scrap or trade-in 12,145 trucks this year and replace them with new ones.

(*Please Turn to Page* 21)

. . . Washington DA

(Continued from Page 16)

Defense Planning Aftermath of recent H-Bomb publicity has left government agencies security-conscious. Business & Defense Services Administration is urging industry to give top spot in planning new facilities to the idea of dispersal. This is particularly applicable to construction of new warehouses and terminals which readily lend themselves to such programming. The BDSA's 25 divisions are actively promoting the program, are acting as clearing houses for information now being assembled by industry task groups, and will help such planning as much as they can.

Stockpile Troubles An increase in the storage problems of the General Services Administration may be expected as a result of the new White House policy which urges an expanded stockpiling program. The agency estimates that it will require at least 25 million square feet of space to handle the $7 billion worth of critical materials already planned. Counting space provided by the military services, GSA has only about 19 million feet of sure space. The agency has authority to build more warehousing but is finding it hard to persuade Congress to provide the money needed—about $16 million.

Taxation Reversal A growing trend toward state taxation of interstate operations, even though the business itself may be located elsewhere, has received at least one setback. The Supreme Court recently upheld the Railway Express Company in its objection to payment of a Virginia license tax which had been levied upon its gross receipts for the privilege of conducting interstate operations in the state.

Capital Trends Day of exclusive franchise to a single company for service stations on toll roads is seen as getting closer. Complaints by highway users who can't get their favorite brands is the reason. Several states are considering plans to permit more industry competition.

. . . Battery additives are due for more spotlighting. Producer of the controversial AD-X2 was scheduled to appear before Federal Trade Commission in early May to defend claims.

. . . Employes in wholesaling, retailing, and service industries are making gains in their campaign for pension programs and prepaid medical services.

. . . Enabling legislation is before Congress which would permit states to require all out-of-state motor vehicles to conform to state inspection and insurance requirements while within their borders.

. . . Exports to foreign nations are expected to gradually increase. Regulations and restrictions gradually are being relaxed, the positive list being expanded.

. . . Class I railroads had a better year in 1953 than 1952, carrier reports show, with a net 1953 income of $875 million compared with $836 million the previous year.

. . . Canned fruits and vegetables now expected to be taken out of the 1954 pack for the armed forces will run about 133 million pounds.

Foreign Demand Use and demand for American type materials handling equipment, vehicles, and related equipment is on the uptrend, although most purchases are in small quantity. A typical week's run through the Office of Small Business includes the following requests: Greece—$300,000 worth of motor vehicles and parts, $200,000 worth of wheel-type tractors, $50,000 worth of ground handling equipment; Turkey—60 steel elevators and related equipment; Thailand—11 pickups and jeeps; Israel—two drum air hoists; Korea—3300 feet of rubber conveyor belting.

Seaway Project White House pressure on Congress has brightened hopes of its backers for legislation authorizing the United States to help Canada develop the St. Lawrence Seaway. Bill moved a step nearer enactment in mid-February when the measure, already through the Senate was reported favorably in a surprise action by the House Committee on Public Works. Final disposition was thus tossed into the House itself where it was still believed to face an uphill fight.

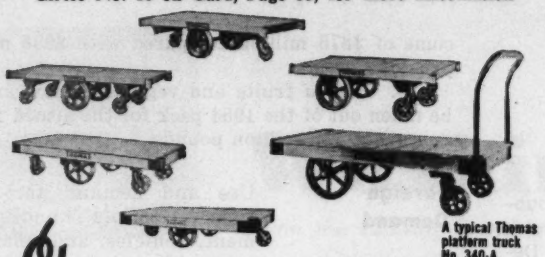
Rail Car Loadings The ICC made public on April 5 an analysis of data supplied by its Bureau of Transport Economics and Statistics showing a 13.7 per cent increase in the average loading of rail cars in 1952 over 1939; and a 3.8 per cent increase over 1944, when war-time controls were in effect.

The data showed the average load per car was 36.77 tons in 1939. In 1944, when railroads operated under controls requiring maximum loading as an emergency measure, the average was 40.27 tons. In 1952, the average had increased to 41.81 tons per car originated.

Acquisition of new equipment by the railroads between 1939 and the end of 1952 led to a seven per cent increase in the average capacity of freight cars of all types.

The highest percentage gain was shown in the capacity of box cars, 8.1 per cent. Other type car increases (in percentages) were: Flat, 6.8; Stock, 0.5; Gondola and Hopper, 5.6; Tank, 5.8; Refrigerator, 5.0.

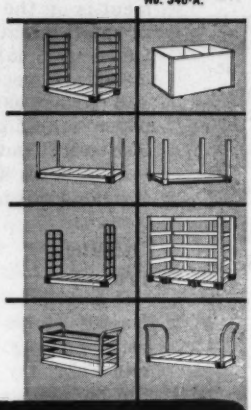
Circle No. 13 on Card, Page 35, for more information



A typical Thomas platform truck No. 340-A.

Choose FROM SIX DIFFERENT TRUCK CHASSIS and 1000 superstructures

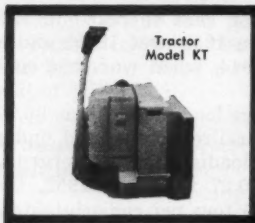
The Thomas "Job-Suited" plan enables you to choose quickly and accurately the most efficient truck for your particular freight or materials handling problem. FIRST—you choose any chassis or running gear that will *carry* your load. SECOND—you choose one of the 1000 superstructures to *hold* your load. PRESTO—you have a Thomas "Job-Suited" truck specially tailored to your needs! ANY CAPACITY, ANY SUPERSTRUCTURE, FOR ANY USE!

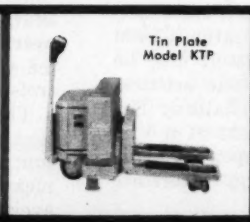


Write for Free Catalog giving "Job-Suited" particulars.

THOMAS TRUCK & CASTER CO.

492 Mississippi River, Keokuk, Iowa





High Lift—Model KHL

HydroLectric LIFT TRUCKS

For the Heavy Load • For the Light Load • For the Unusual Load

Look over the models illustrated. Some one of these trucks is adaptable to your needs. Whether you want to pull—push—carry or lift there is a model for every possible use. The many fleets of HYDROLECTRICS today carry products of every kind, shape and description are convincing evidence of their unusual application.

Write today for FREE Catalog No. 35 featuring complete line of Lift Trucks.

Ridertractor—Model KTR

Pallet—Model KPN-KPW

Tongue Lift—Model KTL

LIFT TRUCKS INCORPORATED

2423-31 SPRING GROVE AVE. CINCINNATI 14, OHIO

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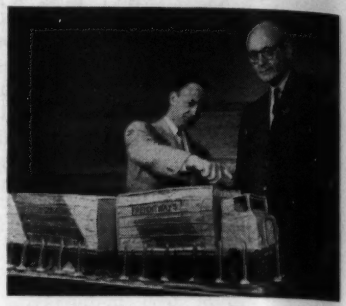
Industry

Happy Birthday



Oregon Trucking Group Honors Consolidated: The Oregon Trucking Associations took advantage of Consolidated Freightways' 25th Anniversary Sales Conference in Portland, Ore., last month to present this birthday cake to Consolidated President Lee James (right). Bob Knipe, OTA assistant manager, is making the presentation. Consolidated celebrated its Silver Anniversary April 1

Wright-Hibbard Industrial Electric Truck Co. announces the appointment of Adrian Drew, Minneapolis, Minn., as distributor.

Perfect Shipping Progress Train is the name of a 14-car special that is touring seven western states. Sponsored by the Central Western and Pacific Northwest Shippers Advisory Boards, the train was assembled by **Union Pacific Railroad.**

The College of Engineering at Cornell University, Ithaca, N. Y., has been selected as a participant in the annual $12,000 **Dravo Corp.** Scholarship Program.

Spector Motor Service has placed orders for 200 new **Fruehauf** trailers with delivery to start immediately.

DC-4 Cargoliner service of **United Air Lines** has been expanded to include Salt Lake City, which becomes the 14th city on the company's 13,250-mile system to receive direct, all-cargo flights.

The Yale and Towne Road Show—world's first traveling materials handling show—this month rounded out 25,000 miles covering 30 states in its first year on the road.

Appointment of **Cashman GMC Truck Co.**, of Las Vegas, Nev., as dealers in Hyster industrial truck equipment has been announced by **Hyster Co.** officials.

National Carloading Corp. has announced the opening of a modern new terminal in Atlanta, Ga., and a consolidated station in Memphis, Tenn.

Items

Mobile Communications

Unit Includes Antennae, Tractor-Trailer and Pup Trailer with Motor Generator Set: With the addition of three new trailer-mounted mobile communications centers, Los Angeles becomes the first city in the nation to provide a flexible, integated communications network for its Civil Defense unit. Three new $40,000 units tie into 36 fixed communications centers reaching 900 message centers

A new all-van, door-to-door moving service between any points in the United States and Alaska has been initiated by **Allied Van Lines, Inc.**

Registrations of **White Trucks** in the 19,501 gross-vehicle-weight class and up during January increased by nearly 22 per cent over the number in this weight registered in the initial month of 1953.

Baltimore and Ohio Railroad income from all sources was $471,235,553, an increase of $19,083,357, or 4.22 per cent over 1952.

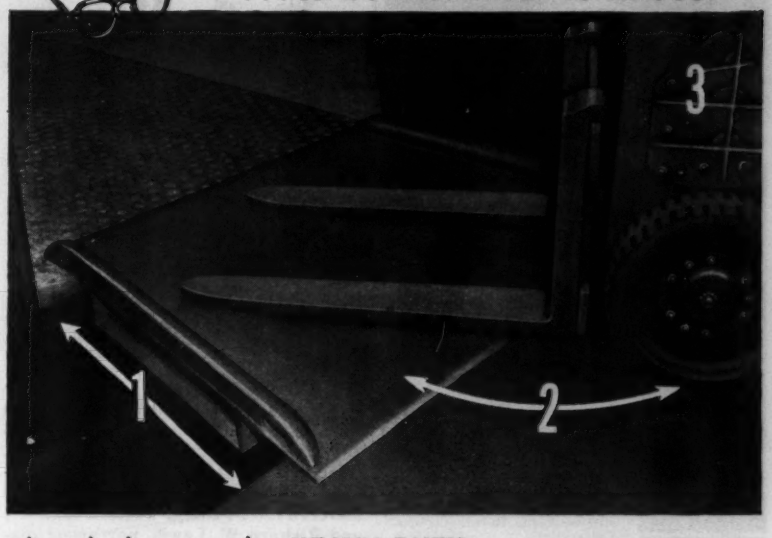
Estimated net income of 130 Class I railroads in January 1954 after interest and rentals, amounted to $18 million, compared with $57 million in the same month in 1953, according to reports filed by the carriers with the Bureau of Railway Economics of the **Association of American Railroads.**

Final earnings of **Robert Gair Co., Inc.,** for 1953, show consolidated net income of $6,451,541, or $2.96 a common share in 1953. This compares with $5,800,122, or $2.79 a share reported in 1952.

Fruehauf Trailer Co. sales last year reached an all-time high of $193,592,531—an 18.9 per cent increase over the previous high of $162,809,644 recorded in 1952.

Yale & Towne Mfg. Co. completed its 85th year with a record volume of sales. Consolidated net sales for all 13 plants here and abroad totaled $109,626,417 in 1953, as compared with $93,190,206 in 1952.

LOOKING INTO THE FACTS
. . . LEADS INEVITABLY TO MAGCOA

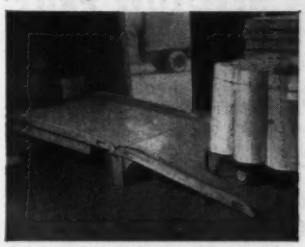


This light-weight **HEAVY-DUTY**
MAGCOA DOCKBOARD
is a Better Investment . . . and here's why

1. **Made for this Specific Span**—You know the problem of bridging car-dock and truck-dock spans. No problem in this case: the Magcoa representative specified the exact size Dockboard *for this span.*
2. **Made for this Specific Turning Radius**—This is a narrow dock. The lift truck's turning radius could have presented a problem—but didn't. This Magcoa Dockboard flares out just enough for this narrow dock . . . permits part of the turn to be made while the truck is on the board.
3. **Made for this Specific Truck and its Load**—As you know, the weight of different handling equipment and loads varies considerably. No problem here: this Dockboard was made for the specific weight requirements of this company's equipment with top capacity loads.

Quick Delivery—Long Life—Low Net Cost—Ordinarily you'd assume that equipment designed for specific requirements would get a premium price or take longer to manufacture. No problem on that score: Every Magcoa Dockboard is manufactured on a mass-production basis; and, if there is sometimes a price differential, it can be checked off as negligible compared to the greater long time value you get in a Dockboard that fits your specific needs.

Safety, Economy, Efficiency Features—Only Magcoa gives you all these features: (1) rounded curb-ends for safer turns, (2) quarter-round safety curbs that protect tires while preventing run-offs, (3) comfortable one-piece hand holds for safe lifting and positioning, (4) angled crown that keeps edges flush on floors, (5) rounded edge beveling that saves tires, equipment, loads, and (6) rugged safety spans for extra strength and elimination of slipping.



Another "tough" bridgeplate problem solved quickly *and permanently* by a Magcoa Dockboard.

Magcoa Service—At Your Service—If your Dockboard needs repair because of abuse or misuse, Magcoa Service is at your service—to put your equipment in good working order, in short order!

Looking into the Facts is the title of our new facts file. It's loaded with information you ought to have to make a sound Dockboard investment . . . and it's yours for the asking. At the same time, look into the new Magcoa Portable Yard Ramp. It's a rugged, high-speed loading dock . . . where and when you want it.

MAGNESIUM COMPANY OF AMERICA
MATERIALS HANDLING DIV., EAST CHICAGO 3, IND. — *Representatives in Principal Cities*

DIVISION OFFICES:
NEW YORK 20
30 Rockefeller Plaza
PHILADELPHIA 18
8001 Southampton Ave.
WASHINGTON 5, D.C.
Walker Bldg.
HOUSTON 17
7657 Moline St.
EL SEGUNDO (Los Angeles), California
1017 El Segundo Boulevard

Please send: ☐ Dockboard Facts File ☐ Portable Yard Ramp Literature 3
Name & Title
Company
Address
City-Zone-State

Circle No. 15 on Card, Page 35, for more information

Circle 17 on Readers' Service Card

REVOLVATOR
GO-GETTER
Lift Efficiency

Door-to-Door Warehouse Handling Efficiency

For the efficient flow of goods within and without a plant — from production to storage — to shipping — there is no lift truck on the market today that surpasses the Revolvator Go-Getter line.

Illustrated above is the high lift model Go-Getter—a favorite of the food producers — accepted throughout all industry. In 2000-3000 lb. capacities —remarkably adept in narrow aisle work, the Revolvator Go-Getter high lift truck permits great economies in warehousing.

Write for the full facts today.

REVOLVATOR CO.
8796 Tonnele Ave. North Bergen, N. J.

Men in the News

Materials Handling

Dr. William H. Newman, of Columbia University, has been named to the Board of Directors of Richardson Scale Co.

O. B. Law—new district representative, west central district; **Nile H. Bartell**, eastern district; **George T. Japhet**, southern district; **Frank Reach, Jr.**, east central district; **Clarence E. Zermer**, southwest district; **Devereux W. Pedley**, western district; and **Richard W. Lewis**, northwest district, Clark Equipment Co.

Ben Colman, former president of General American-Evans Co., rejoined the Evans Products Co.

E. W. McCaul—named vice president, sales, Jervis B. Webb Co., Detroit, Mich. **George Webb**—new Michigan regional sales manager.

J. A. Dickson — appointed district manager, southeastern states, Steel Strapping Div., Stanley Works, New Britain, Conn.

W. G. Lanterman—new Cleveland regional manager, Lamson Corp., Syracuse, N. Y.

Jack L. Ware—named general chairman of the 9th National Industrial Packaging and Materials Handling Exposition by SIPMHE.

Packing & Packaging

Kenneth K. Dean has been named chairman of the Advisory Board for the 5th Western Packaging and Materials Handling Show.

Karl R. Bendetsen—new manager, Texas Div., Champion Paper and Fibre Co., Hamilton, O.

Arthur J. Brewster—named manager of the Angelus Corrugated Box Div., Robert Gair Co., New York, N. Y.

T. W. Sharp was named manager of the Flexible Packaging Materials Div., Bakelite Co.

Traffic

Gilmer B. Randolph—new civilian deputy assistant chief of transportation (traffic).

R. C. Chamberlain—new traffic manager, Pabco Products, San Francisco, Cal. **E. J. Clark**—named traffic manager at Metuchen, N. J., plant. **P. W. Pollock**—new assistant traffic manager, San Francisco.

Albert O. Elste—of Western Electric Co. and a member of the Metropolitan Traffic Assn. of N. Y., died March 17.

J. Milton Connors—promoted to Western Division traffic manager, Tide Water Associated Oil Co., San Francisco, Cal.

Charles R. Seal—appointed a member of the National Industrial Traffic League's Committee on Transportation Outlook and Policy.

marforge

WHEEL CONVEYOR
at a NEW LOW PRICE

(for a limited time)
$26.95
per 10-foot section*
12" Width

Bottlenecks in business destroy profits! *Speed* in the loading, unloading and moving of *YOUR* merchandise is the factor that breaks bottlenecks in handling operations, and gives you an even flow of production.

marforge
IS BEST
FOR YOUR
DOLLAR!
Made by the
makers of
LIFT TRUCKS
PALLET TRUCKS
(hand & power)
POWER FORK TRUCKS
TRACTORS
TRAILERS
FLOOR TRUCKS

F.O.B. EVERETT

Representatives in all the principal cities

BREAK THE BOTTLENECK OF SLOWED-UP LOADING WITH A MARFORGE LOAD-VEYOR

Market Forge LOAD-VEYORS are the "magic carpet" of material handling operations . . . your loads literally "flow" to their proper destination. If you want to save money *at the profit end* of production, use the MARFORGE "Load-Veyor" system — it's the lightest, strongest, most economical conveyor you can use.

SEND FOR CATALOG

*Prices of curves, stands and 5-foot sections on request.

56 years in the Materials Handling business

Market Forge Company
MATERIALS HANDLING DIVISION
35 Garvey St., Everett 49, Mass.

Circle No. 18 on Card, Page 35, for more information

Mario Michael Garthe—new assistant traffic manager, Hermann Forwarding Co., New Brunswick, N. J.

Transportation—Air

D. Walter Swan—appointed deputy assistant secretary for public affairs in the U. S. Department of Defense. He also is assistant to the president of United Air Lines.

—Highway

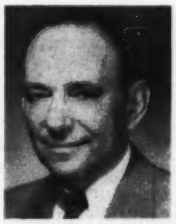
Robert Edwards is new advertising manager of Trailmobile, Inc. He comes from Farson, Huff and Northlich agency.

Russel C. Burns—named supervisor of International Harvester's motor truck fleet sales.

William A. Burns—named to 3-year term as director of the Greater Cincinnati Safety Council. He also is president of Trailmobile, Inc.

Bertram H. Peterson, Jr.—appointed assistant to the vice president, Associated Transport, Inc., New York, N. Y.

James Bruce—elected a director of Fruehauf Trailer Co. He is a former U. S. ambassador to Argentina.



J. P. Dragin has been named controller of White Motor Co. He has been assistant vice president since 1951.

—Rail

R. E. O'Donnell—promoted to secretary of the Freight Claim Division of the Association of American Railroads.

Alex H. Hart—new special assistant to the traffic department of Canadian National Railways.

David O. Mathews—named director of Chicago and Eastern Illinois Railroad. He also is vice president and general counsel for the road.

—Water

Charles K. Paul—appointed executive assistant to the director of marine terminals, Port of New York Authority.

Troy Garrison—appointed public relations representative for Los Angeles, Cal., Harbor Dept.

Loading Dock... or Parking Lot?

...one of Magliner's 34 Standard Dock Boards will load Your Trucks

FASTER...SAFER...AT LOWER COST!

Magliner standard magnesium dock boards insure swift in-and-out truck movement . . . prevent valuable loading areas from becoming costly parking space! Magliner's 34 load-engineered standard models provide a low-cost link between truck and dock for virtually all truck docks . . . eliminate the need for expensive, custom-made equipment. Get smooth, rapid material flow from carrier to plant . . . keep trucks on the move! Gain substantial reductions in loading and unloading costs! Equip your truck docks with *magnesium*-light, *magnesium*-strong Magliner standard dock boards! Write today for bulletin DB-203.

MagLiner STANDARD MAGNESIUM DOCK BOARDS

Light! Strong! Safe!

Adjustable To Varying Heights and Spans

WRITE FOR BULLETIN DB-203!

Exclusive AUTOMATIC DROP LOCK—(pat. applied for)

- Positive Lock Prevents Slippage
- Quickly . . . Easily Adjustable

Custom-Engineered Dock Boards Also Available—Write For Information

MAGLINE INC. • P.O. BOX 344 • PINCONNING, MICHIGAN

Circle No. 19 on Card, Page 35, for more information

Best for big loads in city traffic

New INTERNATIONAL cab-forward RC-180 Series. GVW ratings, 17,000 to 21,000 lbs. 130-hp. Black Diamond 282 valve-in-head engine. 112, 130, 142, 154, and 172-inch wheelbases.

INTERNATIONAL cab-forward trucks offer big advantages to haulers who move loads through today's congested streets.

- **Shorter overall length** saves dock space, simplifies parking in congested areas.
- **Shorter turning radius** gives them greater maneuverability and easier turn-around in narrow streets and loading areas.
- **Readily accessible engines,** clutches and transmissions speed inspections and servicing, lower maintenance costs.

INTERNATIONAL cab-forward models save driver time and energy . . . reduce loading and unloading time . . . make possible more deliveries per day.

Their design features, plus the endurance and economy qualities that have made INTERNATIONAL the heavy-duty sales leader for 21 straight years, cut the entire cost of truck transport in traffic.

Your INTERNATIONAL dealer or branch will be glad to work with you to determine the INTERNATIONAL cab-forward model *exactly right* for your job. Call today and get full facts. Time payments arranged.

AMERICA'S MOST COMPLETE TRUCK LINE

170 basic models from ½-ton pickups to 90,000 lbs. GVW off-highway models . . . including six-wheel, four-wheel drive, cab-forward and multi-stop delivery types . . . 29 engines from 100 to 356 hp., with widest choice of gasoline, LPG or diesel power . . . wheelbases, transmissions and axle ratios for any need . . . thousands of variations for exact job specialization.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL® TRUCKS

"Standard of the Highway"

Circle No. 20 on Card, Page 35, for more information

Sixth Annual Meeting in St. Louis May 24-27 will include visits to leading local units to inspect freight handling systems — plus panel discussions on a variety of problems, trends and developments in the trucking field

MAY, 1954
Vol. 53, No. 5

TOC Meeting To Feature Eight Technical Sessions

TERMINAL Operations Council, American Trucking Associations, has arranged a program of eight timely topics, and visits to four leading local terminals for the Sixth Annual Meeting in St. Louis, May 24-27.

The four-day meeting will be conducted in the Sheraton Hotel. M. S. Lee is program committee chairman. Following registration and committee meetings on the opening day, a series of terminal visits is scheduled to illustrate various freight handling methods.

Terminal Visits

The following terminals, with the types of handling systems used, are included in the tour: Arkansas Motor Freight Lines, two-wheel hand truck; Lee Way Motor Freight, overhead dragline; Pacific Intermountain Express, electric fork trucks, and Be-Mac Transport, floor type dragline.

W. P. Davis, Associated Transport, will preside over Tuesday's meetings. Two speakers are scheduled for the morning session: C. E. Swett, Shippers Dispatch, will speak on "Trends in Terminal Design," and A. W. Greene, DISTRIBUTION AGE, will speak on "Trends in Terminal Freight Handling."

Tuesday afternoon will feature a panel on the subject, "We Sell Service—How We Do It." T. L. McCombs, Roadway Express, will serve as moderator.

Claims and Profit

Wednesday's meeting will be under the direction of R. Y. Sharpe, Pilot Freight Carriers. "Converting Claims Dollars To Profit Dollars" is the subject of the morning panel, with T. W. O'Neill, Geo. F. Alger Co., as moderator.

Two panels are scheduled for Wednesday afternoon: "Analysis of Branch Detail for Greater Profits," and "Shall We Own and Operate Our Own Equipment?"

Presiding officer Thursday will be T. R. Travillion, Super Service Motor Freight. The morning session will be devoted to a panel on "Training Programs For Terminal Personnel," with James R. Horan, Eastern Motor Express, as moderator. The final panel, "Figuring a Profit and Loss Statement For The Terminal," will be moderated by G. H. Becker, of Murphy Motor Freight Lines.

A question and answer period will follow each presentation. In addition, all meetings will be recorded, and transcribed at a later date.

The Road Ahead

John V. Lawrence, ATA managing director, is scheduled to speak on "The Road Ahead" at Tuesday's luncheon.

Among highlights of the social program announced by the committee are the Monday evening cocktail party at the Sheraton; buffet supper and "Mellerdrammer" Tuesday evening aboard the Mississippi showboat Goldenrod, and the Wednesday evening Monte Carlo party.

In addition, a full round of events has been scheduled for ladies attending the Annual Meeting. •

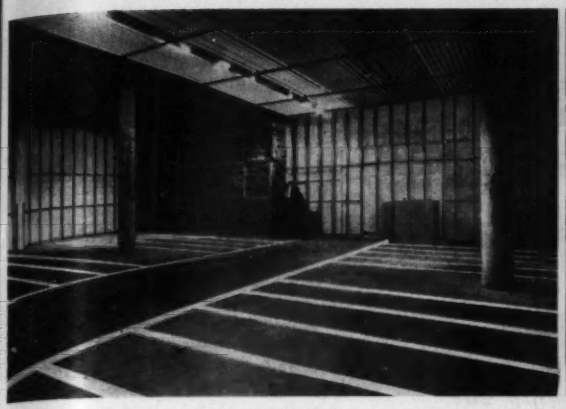
PART 3 — NARW

Handling Revolution In Refrigerated Warehousing

By J. J. Gallery
Mgr., Quincy Market Cold Storage & Warehouse Co. Watertown, Mass.

Higher labor costs and the demand for additional speed in freight handling have fostered a trend toward unit load systems and mechanized handling

Refrigerated warehouseman built a mezzanine floor for storage of palletized small-lot items not suitable for high stacking



High-lift fork truck and palletization permit full use of all cube space in this new single-story refrigerated house

Preplanned stacking and storage is the rule here. A 12-ft aisle width, 16-ft ceiling height were found most convenient

DEMAND for greater speed in freight handling plus the higher cost of labor, have led most refrigerated warehousemen to mechanized operations.

Main Objectives

The three objectives always have been toward maximum utilization of space, maximum utilization of labor, and a speedy handling system consistent with the safety of men and commodities.

Previous to the last war greater stress had been placed on maximum utilization of space, since that was the refrigerated warehouse's basic resource. Commodities stored were held for long periods of time, and it was unusual when freight turnover exceeded four times a year. This maximum space could only be obtained by hand stacking.

Hand equipment, such as wagons and skids for transporting to and from storage areas, was the acceptable tool of labor. During busy seasons when speed was necessary, men and equipment were added to each operation.

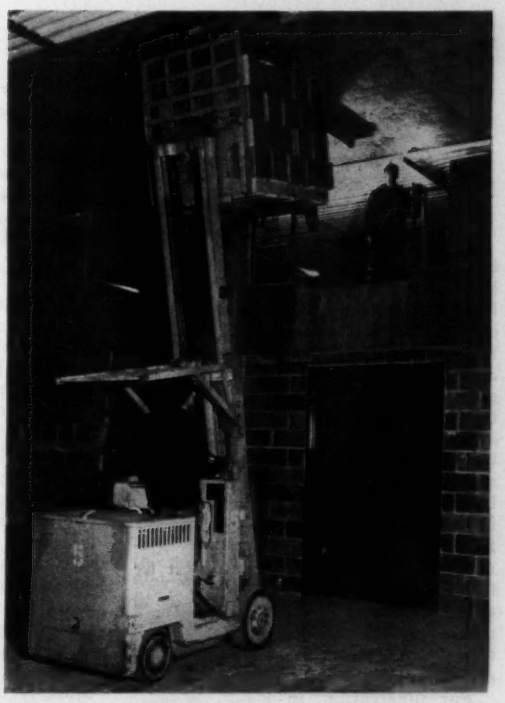
During those times, maximum utilization of labor was secondary. Refrigerated warehouses were built around such a system. Result—multi-story buildings with low storage areas, small elevators, limited floor loads, narrow doorways and aisles; warehouses built in metropolitan areas easily accessible to the warehouse customers.

Commodities usually were received in large quantities by freight car, and moved out in small quantities in slow moving transportation vehicles and in many cases by horse and wagon. Speed was not an important factor in this type business.

Changing Picture

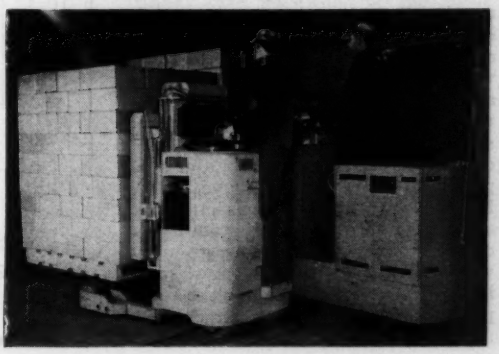
During the last war, the picture changed. The demands for greater tonnage to be handled per day increased, turnover of freight was increased many times and speed was demanded by everyone. Management was forced to add men to each step of the

(*Please Turn to Page* 142)



Fork truck serves as an elevator to deliver pallet loads to mezzanine, where they are handled by jack

On some operations aisle widths can be reduced by using truck on left. Most manufacturers make both



WITHIN THE LAW

By Leo T. Parker

Legal Consultant,
Distribution Age

WAREHOUSING

Can Warehouseman recover fire loss from insurance company when goods are moved from one place to another?

Modern higher courts have consistently held in the past that if a warehouseman removes goods from one location to another without consent of the insurance company, the warehouseman cannot recover the loss in case a fire destroys the removed goods. Other courts hold that it is the duty of all warehousemen to read and understand the insurance protection afforded by an insurance policy and that an insurance company never is liable for promises made by an insurance agent as to coverage afforded by an insurance policy. Recently a higher court went so far as to hold that a warehouseman is obligated to attach a rider and removal permit to his policy, and if he fails to do so the insurance company has no obligation.

For illustration, in F—— W——, Inc., v D—— F—— I—— Co., 59 N. W. (2d) 889, the testimony showed facts, as follows: A company held several insurance policies. A policy was issued on goods stored in a warehouse situated on fair grounds. The merchandise was subsequently stored in a new warehouse completed by the company so that the fair grounds warehouse was not required for storage purposes. Then at the company's request, the insurance company issued a removal permit and an endorsement extending coverage of the policy to merchandise stored in a Monson township warehouse, at the same time terminating the coverage of merchandise in the fair grounds warehouse. This permit was issued in duplicate. Through error the company's employe failed to attach this rider to its insurance policy.

One day Mr. J——, the company's general manager, noted that the policy on its face appeared to still cover only property stored in the fair grounds warehouse. This error was made because the rider or permit to remove goods to the Monson warehouse had not been attached to the policy by the company's employe. Then J—— wrote the insurance company, cancelling the policy. The insurance company did not notify the warehouse company that a permit had been issued for storage of goods in the Monson warehouse.

Soon afterward a fire destroyed the Monson warehouse with goods stored therein. The insurance company refused to pay the loss and the warehouse company filed suit. It was contended that as the insurance company had not repaid the unearned premiums on the policy to the warehouse company and also since the insurance company's records showed that the policy insured goods stored in the Monson warehouse, the insurance company was liable. The higher court refused to agree and said:

"Pass the sugar, please,"

"The unearned premiums became due plaintiff (warehouse company) but the fact that they had not been returned did not alter or change the fact that the policy was effectively terminated in compliance with plaintiff's directions. The record here discloses that, regardless of the mistaken concept of plaintiff's general manager as to coverage of the policy, there was no lack of clarity in the directions he gave to defendant (insurance company) with reference to the cancellation thereof. The removal permit above described had not been attached thereto, although Mr. J—— does not deny that this permit had been received by him.

What is the detailed law on payment of freight and demurrage charges where goods are shipped to a warehouseman?

Over a period of several months I received many letters from warehousemen asking the detailed law on payment of freight and demurrage charges where goods are shipped to a warehouseman, as consignee. Other warehousemen asked whether a warehouseman is liable for payment of freight charges if he acts as agent of the consignor or other party. A few weeks ago an outstanding higher court decision settled these various questions of law. I shall review this new decision.

First, it is important to explain that the consignor is ordinarily liable for transportation charges. He requires the carrier to perform the service when he delivers the goods for transportation, and thereby obligates himself to pay the charges for such transportation. The usual stipulation in a bill of lading that the consignee shall pay such charges is not a contract by the carrier to look to the consignee, but it may deliver the freight and still hold the consignor for the charges. See N.—— Y.—— C.R. Co. v. W—— R—— Lumber Co., 137 N. E. 324, 24 A.L.R. 1160; C—— Ry. Co. v. S—— Co., 248 S. W. 297, 299; N—— v C. Co., 24 A.L.R. 1163; and N.—— Y.—— C. R. Co. v. T—— A—— P—— Corp., 108 F. (2d) 994, 129 A.L.R. 206. All these higher courts hold that a consignor primarily is liable for payment of freight and demurrage charges. On the other hand, the higher courts also hold that the consignee may become liable for the charges. When he accepts the goods the law implies a contract upon his part to pay the charges unless it appears to the knowledge of the carrier that he received the goods not as owner but as agent for another. See P.—— R. Co. v. L—— & S——, Inc., 295 Mass. 179, 3 N. E. (2d) 231, 105 A.L.R. 1211; Annotation, 105 A.L.R. 1216. If the carrier has no knowledge that a warehouse company is agent of another it is liable for transportation charges.

The above mentioned new higher court decision is T—— C—— Ry. Co. v. C—— S—— & W—— Co., 260 S. W. (2d) 208. The testimony showed that the C—— S—— & W—— Co. is engaged in the storage and warehouse business in Nashville, its warehouse being on the bank of the Cumberland River; and it has a spur track running from its warehouse. It acts as agent for shippers by rail and river, receiving and unloading shipments consigned to it and often reloading them for reshipment to other points.

Further testimony showed that a railway company sued the warehouse company to recover demurrage charges in the sum of $787.95 alleged to be due on some 59 cars of scrap iron consigned and delivered to the warehouse company and handled for its account.

C—— & B—— were dealers in scrap iron with a place of business in Nashville, several miles from the warehouse company's warehouse. C—— & B—— would ship scrap iron by rail to the warehouse company and thence by river barge to steel mills outside the State of Tennessee. The cars of scrap iron would be consigned to the warehouse company which would receive and unload the cars and reload the scrap iron on a barge for C—— & B——.

C—— & B—— shipped a number of cars of scrap iron consigned to the warehouse company at its warehouse to be transferred to a barge for reshipment. No barge had then arrived, and the above mentioned demurrage charges accumulated.

The higher court held the warehouse company obligated to pay the demurrage charges, saying:

"It is undisputed that the demurrage charges sued for accrued on the cars of a scrap iron which C—— & B—— shipped and consigned to defendant (warehouse company) and that such charges were made persuant to the applicable tariffs and the amount of them was correct. It is likewise undisputed that defendant-consignee (warehouse company) . . . stood in relation to agent. In performance of this service defendant (warehouse company) became liable to complainant (carrier) for the demurrage charges."

This court held that demurrage charges on railroad cars are part of the transportation charges and are covered by the I.C.C. tariffs and the Interstate Commerce Act, and they must be collected by the carrier from the shipper or consignee to the same extent as freight charges.

This court also held that although the warehouse company must pay the demurrage charge to the carrier, the warehouse company may collect the charges from C. & B. In this respect, the court said:

"The proof showed that the warehouse company was liable to the railway and was entitled to a judgment against C—— & B—— for its reimbursement."

If a warehouseman removes goods from one location to another, without the consent of the insurance company, can he recover the loss in the event that fire destroys all or part of the goods while in transit or at its new site?

If a warehouseman takes possession of merchandise can a trustee in bankruptcy regain goods?

According to a late higher court decision the answer is no.

For instance, in B—— v. L—— Warehouse Co., 190 Fed. (2d) 433, the complete testimony disclosed these facts: C—— A—— Supply Co., a retail dealer, found itself in financial difficulty. In order to continue to operate as a going concern, and in the hope of extricating itself from financial distress, the company borrowed money from a bank. To obtain these loans, the company entered into certain transactions in conformity with what has become known commercially as "field warehousing." The object of this plan was to afford security to the bank through a transfer of possession and control of the company's stock in trade to the L—— Warehouse Co., and the issuance by warehouseman of warehouse receipts in favor of the bank.

In order to accomplish this, the company executed a lease to the warehouseman of a portion of its premises, containing the major part of its stock in trade. Wire mesh fences were erected which separated the leased area from the other portions of the floor, and locks were placed upon doors opening on the field warehouse area. Conspicuous signs were posted at points along the enclosed area stating: "Notice—All Commodities in or Upon These Premises Are in The Custody of L—— Warehouse Co."

When merchandise, purchased by the company wholesalers, jobbers and manufacturers arrived at the premises it was placed within the enclosed area. The warehouseman then issued non-negotiable warehouse receipts for the goods in favor of the bank, in conformity with the Uniform Warehouse Receipts Act. Loans were made to the company by the bank based upon a percentage of the cost value.

Persons who had formerly been employes of the company were employed by the warehouseman to act as custodians of the goods. Salaries were paid by the warehouseman.

After a time the company became bankrupt. The legal question presented the court was: Can the trustee in bankruptcy take possession of the goods in the warehouse and then distribute the value of the goods among common creditors, or can the warehouseman keep possession of the goods?

The higher court held that the warehouseman can keep possession of the goods, saying: "If a field warehousing arrangement is conceived in good faith and carried on with the proper safeguards, possession and control of the property are not with the owner, but are transferred to the warehousing company. The fact that the purpose of the arrangement is to obtain financing rather than storage does not in itself nullify the plan."

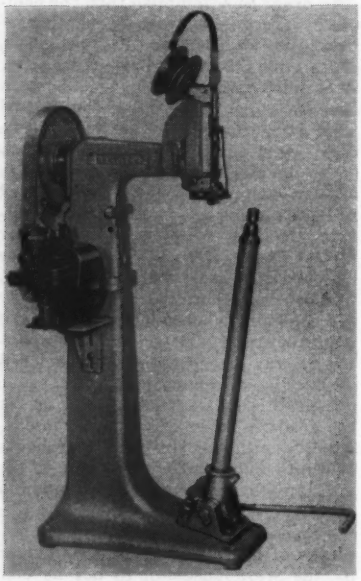
"Nice going Father, two lucky bucks."

DA New PRODUCTS

FOR FURTHER INFORMATION USE READERS' SERVICE

Gas-Driven Stitcher

Bostitch, which produces a line of 67 wire stitcher models, announces a new gasoline-operated motor drive which is available on its No. 14 and No. 148 box and bottom stitchers. With this new power

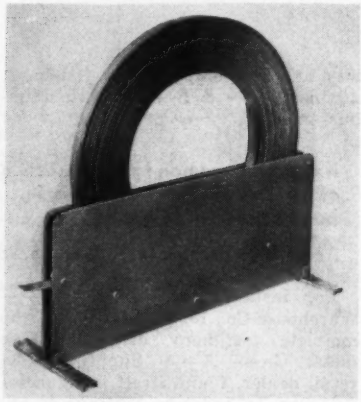


unit it is now possible to utilize wire stitching in locations where electric power is not available and to change the location of the stitcher frequently, if desired, without the necessity of arranging for electrical connections.

Circle 50 on Service Card, Page 35

Heavy Duty Strapping Unit

A new heavy-duty Combination Strapping Unit has a stationary type dispensing reel which holds a ribbon wound coil of Bulkbinder ¾ in., 1¼ in. or 2 in. steel strapping on three roller bearings for quick and easy uncoiling. In addition to the reel, the outfit contains the following A. J. Gerrard & Co.



equipment—Bulkbinder stretcher, sealer, strapping, seals and strap cutter.

Circle 51 on Service Card, Page 35

Wire Mesh Conveyor

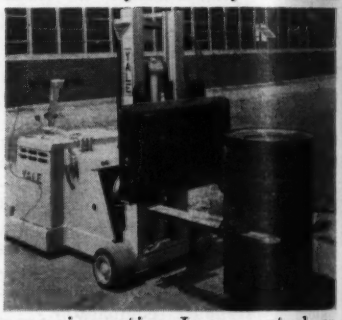
New addition to the line of conveyors manufactured by Sage Equipment Co. is this series of

power driven, wire mesh belt conveyors, made in a wide variety of widths and lengths. Typical examples of their multiple functions are washing, spraying, cooling, freezing, cooking, baking, drying, annealing, molding, ceramic firing, heat treating, and many other operations.

Circle 52 on Service Card, Page 35

For Pallets, Drums, Boxes

The Yale Worksaver Fork Lift Truck shown is equipped with a new attachment for handling drums. With slip-on box clamping jaws, the device also handles boxes and cartons. Many other types of loads can be handled by the forks which exert a hydraulically controlled

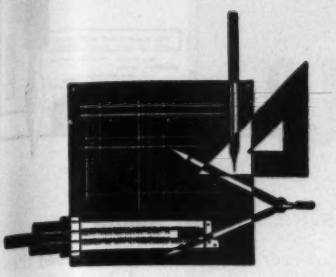


squeezing action. Lever controls enable the operator to vary fork spread hydraulically between 18 in. minimum and 62 in. maximum centers. This arrangement makes possible the handling of a wide variety of pallet sizes.

Circle 53 on Service Card, Page 35

Tote Box Cart

A new utility cart made of 1 in. seamless steel tubing is designed to carry four lightweight tote boxes. Finished in chip-resistant flat enamel, the cart is mounted on 3 in. ball bearing casters and comes com-



CARD....PAGE 35

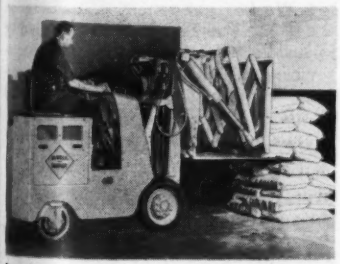
plete with four plastic tote boxes. Each box weighs just 4.1 lb, measures 18 x 12 x 8 in. inside and

holds 1 cu ft. Manufactured by Laboratory Construction Co., the cart is designed to hold the boxes so they come out easily without slipping or sliding.

Circle 54 on Service Card, Page 35

Palletless Handling

A newly designed hydraulic pusher device for use on hydraulically actuated fork trucks has been

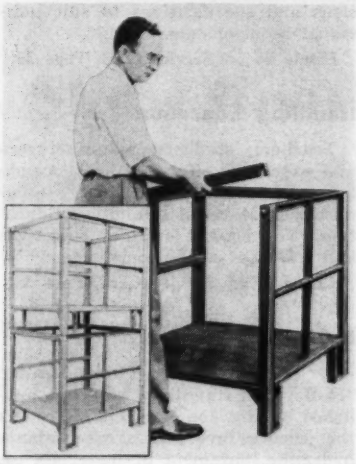


developed by The Elwell-Parker Electric Co. The attachment provides a means for mechanically pushing a load off a truck's forks and is designed principally for handling loads without pallets. The mechanism for the pusher is mounted alongside the truck's uprights so that the possibility of damage during travel is minimized. The attachment does not reduce the capacity of a truck.

Circle 55 on Service Card, Page 35

Gate Type Stacking Pallet

Equipment Mfg., Inc. has developed a stacking pallet for handling cylindrical shapes that stand on end.

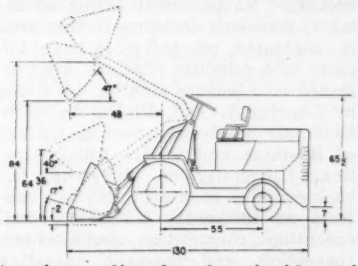


Ends are open for easy loading from either side and hinged cross arms which drop out of the way for loading can be raised and hooked on studs joining the side supports and enclosing the load. A hardwood floor is used in the pallet and access is provided for lift truck handling from four sides.

Circle 56 on Service Card, Page 35

Versatile Features

The Model 20 with a 12 cu ft bucket lifts 1,500 lb of bulk materials to 7 ft height. It has a 90 in.

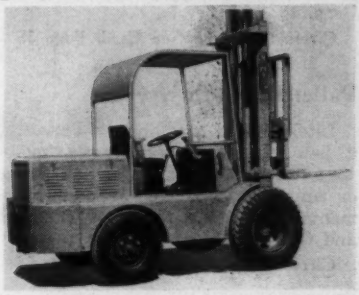


turning radius for close inside and outside work, like boxcars, bins and stockpiles. It easily switches from loader bucket to adjustable lift forks, or special bucket and crane hook. The bucket suspends in low travelling position to give complete forward visibility and has the same width as the machine.

Circle 57 on Service Card, Page 35

Two New Models

Two new Champ lift trucks, Model 700 with a 100 hp International engine and Model 600 with the new Chrysler industrial Model 16 engine, are announced by the Champ

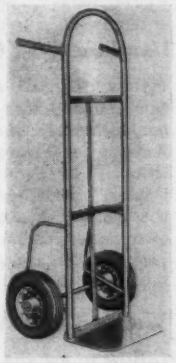


Corp. Lift masts are from 14 to 20 ft on the 700 and from 8 to 20 ft on the 600. Finger-tip control, power steering, power brakes, maximum road clearance, greater maneuverability in close quarters, are a few of the new features.

Circle 58 on Service Card, Page 35

Improved Hand Truck

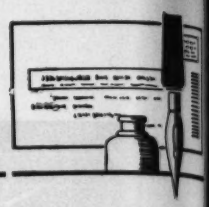
An improvement in the glides of this light weight hand truck, manufactured by Nutting Truck & Caster Co., is claimed to provide easier, safer and better balanced handling up and down curbs or stairs. Rather than the intermittent raising and lowering of the load as with conventional glides, these new glides permit a smooth slide in a position approximately parallel to the slope of the curbs or stairs.



It is made of all electrically welded tubular steel with choice of single or double handles, and open or solid plate noses in 5, 7, or 9 in. lengths. Frame size is 14 in. by 47 in. high.

Circle 59 on Service Card, Page 35

FREE Literature



Shipping Requirements

A folder listing consular documentary requirements and charges for air and steamer shipments from the United States to 155 world destinations has been made available to shippers by Air Express International Corp.

Circle 60 on Service Card, Page 35

Palletizing Adhesive

Literature is available on Palletite, a new non-skid, ready-to-use, moisture-resistant adhesive for palletizing or unitloading of bag or case shipments. Palletite is produced by Swift and Co.

Circle 61 on Service Card, Page 35

Self-Leveling Ramps

Globe Hoist Co. has issued a brochure on its Globe Self-Leveling Ramps. Hinged to the dock, the outer lip of the ramp moves up and down to make contact with varying levels of truck beds, then rides securely throughout loading or unloading operations.

Circle 62 on Service Card, Page 35

Building Maintenance

A new folder prepared by Stonhard Co., makers of building maintenance materials, tells how to solve dangerous floor conditions, how to patch or overlay concrete areas, how to harden concrete surfaces, and how to prevent seepage and water leaks.

Circle 63 on Service Card, Page 35

Handling Cost Cutter

How planned materials handling can reduce costs is explained in a non-technical guide published by Automatic Transportation Co. Entitled, "The Materials Handling Cost Cutter," the guide is intended to help the general businessman analyze his own materials handling problems.

Circle 64 on Service Card, Page 35

Walkie-Type Trucks

How to get the most out of walkie-type electric industrial trucks is treated in cartoon style in Bulletin P-1033 issued by Yale and Towne Mfg. Co.

Circle 65 on Service Card, Page 35

Trackless Train Handling

A brochure describing Type A-310 trailers, used with trackless train materials handling systems, has been issued by Mercury Mfg. Co. The A-310 is a caster-steer trailer which has been standardized in its basic elements, but can be varied in dimensions and specifications to suit individual requirements.

Circle 66 on Service Card, Page 35

Handling Education

Teachers, students, manufacturers and users are offered a booklet published by the College-Industry Committee on Materials Handling Education. The booklet outlines objectives and activities of the committee.

Circle 67 on Service Card, Page 35

In-Between Handling

A 20-page pocket guide entitled "In-Between Handling" has been published by Big Joe Mfg. Co. It covers the science involving short distance hydraulic movement of materials too heavy for manual handling, but not requiring higher priced motor driven equipment.

Circle 68 on Service Card, Page 35

BOOKS

Carrier Operating Rights

"Operating Rights of Motor Carriers" provides an analysis and delineation of the ICC regarding operating rights of motor carriers of property as they apply to intercity common and contract motor carriers, to private and exempt carriers, and to brokers. No pertinent factor affecting Commission decisions in this area is eliminated, yet the more than 425 cases with complete citations, are presented in a concise manner. Written by Charles A. Taff, Ph.D., Associate Professor of Transportation, College of Business and Public Administration, University of Maryland, the book contains such all important subjects as temporary authority, dual operations, competition, abandonment, revocation, and dormant operating rights. William C. Brown Co., 915 Main St., Dubuque, Iowa, 264 pp, $4.

Self-Contained Ramps

Leroy L. Colon Co. has issued literature on its line of hydraulic and manual self-contained loading ramp units. The ramps, in 10- and 20,000-lb capacities, are adaptable for flush deck operations and high and low loading and unloading.

Circle 69 on Service Card, Page 35

Floor-To-Floor Transfer

Multi-story plants with large floor-to-floor traffic of file folders, mail, books, periodicals and similar items are invited to investigate automatic vertical conveyors in a new booklet published by Lamson Corp.

Circle 70 on Service Card, Page 35

Trucking—Economic Giant

"Economic Giant" is the title of a new booklet published by the American Trucking Associations. It employs the cartoon technique to illustrate trucking's part in our national economy and way of life.

Circle 71 on Service Card, Page 35

Payloader Capacity Data

In order to provide more complete and accurate data for users of 4-wheel, pneumatic-tired, tractor-shovel equipment and to clarify some of the confusion resulting from the absence of standardization of capacity listings, The Frank G. Hough Co. has announced that both the truck-load and "pay-load" capacities are available for all models of the Payloader line.

Circle 72 on Service Card, Page 35

Steel Strapping Systems

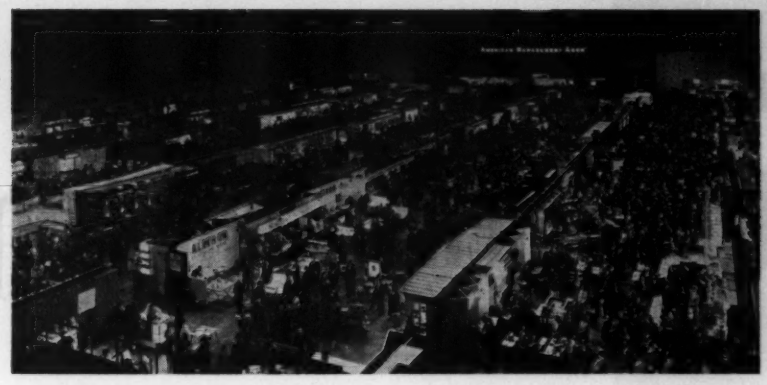
Stanley Steel Strapping Div., Stanley Works, announces a catalog on the complete Stanley line, including strapping tools, equipment and accessories. The catalog is offered to persons concerned with packing and shipping of products.

Circle 73 on Service Card, Page 35

Metal Plate Flooring

A 16-page brochure, published by Flash-Stone Co., describes Ancor Rolled Steel Flooring plates and their uses in armoring heavy-use industrial floors.

Circle 74 on Service Card, Page 35



AMA Show Spotlights Progress in Packaging

23rd National Packaging Exposition attracts 24,200. Conference registration reaches 1,100—show and conference reflect continued growth of the industry

BOTH conference speakers and representatives of exhibiting firms at last month's AMA-sponsored Packaging Exposition in Atlantic City, N. J. offered evidence of the steady growth of the packaging industry.

A total of 24,200 visitors attended the 23rd National Show to view new developments in packaging materials, designs, equipment and services as displayed by 360 exhibitors.

Registration at the three-day AMA Packaging Conference totaled 1,100. At the Conference, executives from every branch of the packaging industry heard 25 speakers discuss trends in the industry, and report case studies of company practices in specific packaging activities.

In a half-day panel type presentation, speakers from Sears, Roebuck and Co. told how their firm built its entire packaging and labeling program around the customer—with material benefits to the company.

Sears Report

Findley Williams, manager of the National Store Planning and Display, moderated the Sears discussion. He said, "What we have given, through better packaging, in terms of shopping convenience to our customers has been returned to us in the form of better customer satisfaction, and increased sales and profits—out of space."

In a second panel, entitled "Packaging Is A Coordinated Effort," company officials outlined the packaging program at Monsanto Chemical Co. T. P. Callahan, manager of Packaging Development, served as chairman of a group of six Monsanto representatives.

The six outlined Monsanto's organization and approach, emphasizing the coordination between package development, purchasing, production, transportation and sales.

Dr. Hugh H. Mottern, Research Laboratories manager, served as chairman of a Kraft Foods Co. panel entitled "Research Pays Off." The group credited Kraft's packaging success to the firm's keen interest in and sponsorship of a comprehensive research program.

Other discussions included "Problems and Solutions in Industrial Packaging," with representatives from Sperry Gyroscope, Carrier Corp., and SKF Industries. The conference was opened by John A. Warren, American Home Products Corp., who spoke on, "What's Coming In Packaging."

Next Year's Show

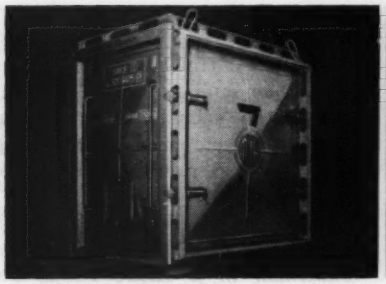
Richard Wellbrock, vice president, New Jersey Machine Corp., was appointed chairman of the Exhibitors' Advisory Committee for the 1955 Exposition. It was announced that next year's show will be conducted during the week of April 19, in the Chicago Ampitheatre. •

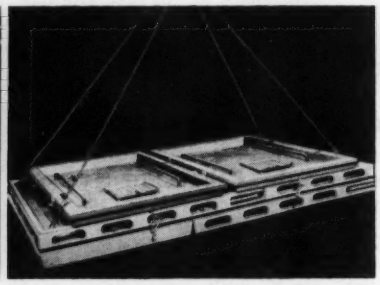
Materials Handling

Equipment Round-Up

Containers

CONTAINERS, whether for consumer shipping or intra- as well as inter-plant use, were improved during the last 12 months. The use of lightweight metals is pronounced. Collapsibility for ease of storage, and multi-purpose usage is a growing trend.

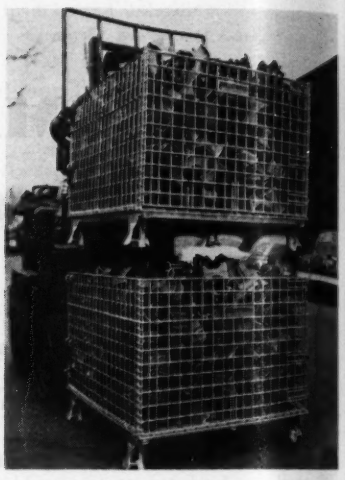




American Premaberg Co.

A rugged waterproof, collapsible container, designed to carry solids, liquids, powders or packaged goods. Their lightness, ruggedness and ability to be safely locked minimizes the danger of pilferage. No tools needed to erect

Circle 100 on Service Card, Page 35



Union Steel Products Co.

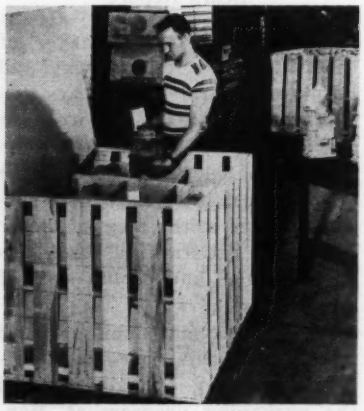
A collapsible container, that provides extra capacity for bulky materials by elimination of center legs and leg braces; in 2, 4, 6,000 lb capacities

Circle 103 on Service Card, Page 35

Parker Sweeper Co.

A multi-purpose canvas cart that folds up like a traveling case. In 15-bu. size, the cart itself can be used as a lightweight hand truck for drums

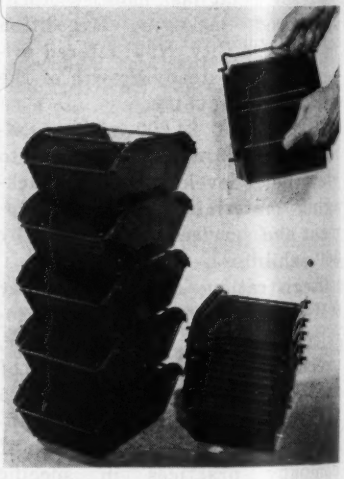
Circle 101 on Service Card, Page 35



American Box Co.

A palletized container, easily handled by fork truck, can serve as a pallet-type production tote box, storage bin and shipping container, if desired

Circle 102 on Service Card, Page 35



Chas. Wm. Doepke Mfg. Co.

Containers that tier or nest have been redesigned to handle very small parts. When folded and nested only about 1/12th of storage space is required

Circle 104 on Service Card, Page 35

Materials handling equipment continues to meet the special needs of users. Here's a round-up of design developments of the past 12 months

C. R. Daniels, Inc.

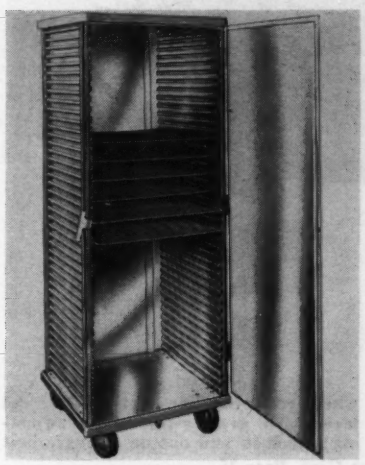
Canvas carts, like this 4-bu capacity elevated basket, are transported on rubber swivel casters. Aluminum framing makes for light, easy handling

Circle 105 on Service Card, Page 35

New "Never Leak" box for meats, seafoods, candy. Self-locking ends, need no tape, glue or stitches. Adaptable as tote tray, if desired

Hinde & Dauch Paper Co.

Circle 106 on Service Card, Page 35



Crescent Metal Products, Inc.

Enclosed cabinets of lightweight aluminum alloy, protect from contaminating elements. Parts pans or tote boxes form own shelves in grooves of the corrugated side walls. Rubber-tired casters increase serviceability

Circle 107 on Service Card, Page 35

Conveyor Specialties Co.

A vertical belt conveyor with automatic in-feed and discharge. Spring loaded rollers permit automatic adjustment up to 2 in. in case size

Circle 108 on Service Card, Page 35

Alvey Conveyor Co.

A drawbridge conveyor, counterweighted for ease of handling, is a practical solution for installation crossing aisles and congested areas

Circle 109 on Service Card, Page 35

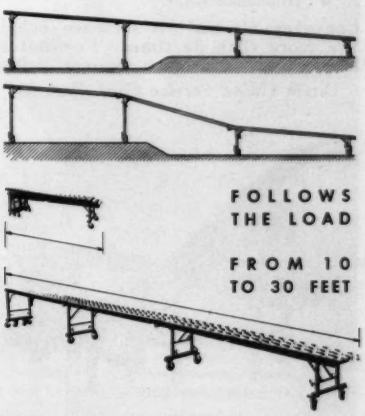
Conveyors

ENGINEERING advancements in the conveyor field have greatly expanded their industrial use. An overhead conveyor requiring no lubrication, nylon bearings that are 17 per cent lighter, a cable conveyor claimed to increase cable life more than 30 times, and a green colored plastic belt to increase inspection efficiency by reducing glare and eye strain were a few design improvements.

A multiple level, two-way rotating Y-switch, a hydraulic package transfer station, and 180-deg power-driven curves improved the control of flow, speed, and direction.

Adjustable spacing of rollers, expanding and retracting designs, and adjustable supports of lightweight metals increased flexibility, space savings and mobility.

(*Please Turn Page*)



Wilkie Conveyor Co.

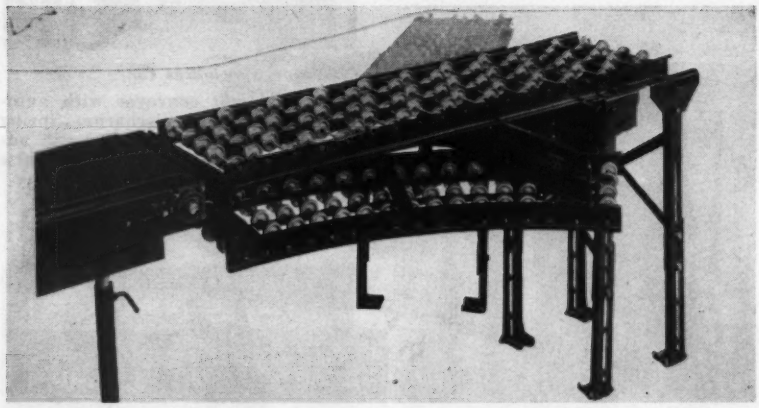
This flexible 10-ft telescoping conveyor can be placed on uneven or stepped surfaces by using adjustable supports. Adaptable to loading heights

Circle 110 on Service Card, Page 35

Materials Handling

Equipment Round-Up

Continued from previous page



The Rapids-Standard Co.

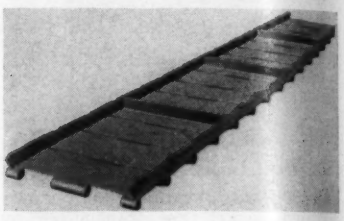
A wheel conveyor spur or Y-switch that can be rotated to connect a two-way belt conveyor with either of two wheel conveyor lines set at different levels. No gravity-line pitch adjusting; stock in and out on a single belt

Circle 111 on Service Card, Page 35

The Belt Corp.

Portable conveyors of this type are increasing. For all types of handling, works without undercarriage on stairs

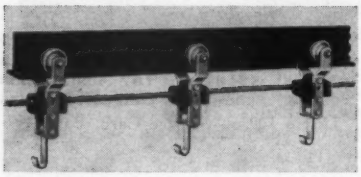
Circle 116 on Service Card, Page 35



Link-Belt Co.

Piano-hinged apron conveyors can be made of various metals, used for conveying metal castings, food products

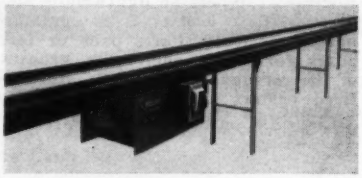
Circle 117 on Service Card, Page 35



E. W. Bushman Co.

Conveyor claimed to increase cable life more than 30 times. Facilitates lubrication to protect against acids

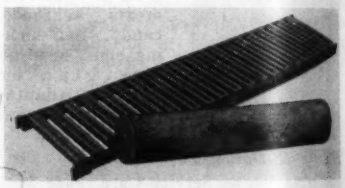
Circle 112 on Service Card, Page 35



Speedways Conveyors, Inc.

In any length, 10-20 in. wide, canvas, oil-resistant neoprene or rough top; sliders or rollers to reduce friction

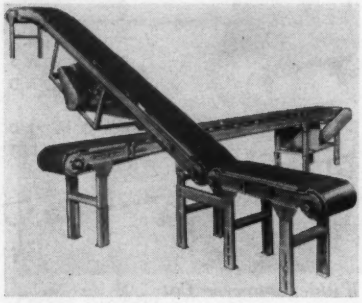
Circle 114 on Service Card, Page 35



Metzgar Conveyor Co.

A nylon bearing, turning on a stainless steel axle, reduces weight of bearings approximately 17 per cent

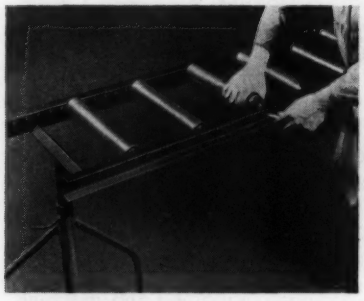
Circle 118 on Service Card, Page 35



Conveyor Specialty Co.

A wide range of speeds and belt widths can be readily assembled into a variety of belt conveyor handling units

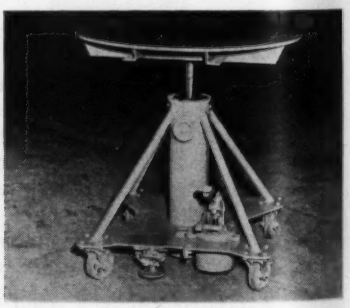
Circle 113 on Service Card, Page 35



Sage Equipment Co.

Pre-punched conveyor frames with variable spacing of rollers to meet any changes in product or container shapes

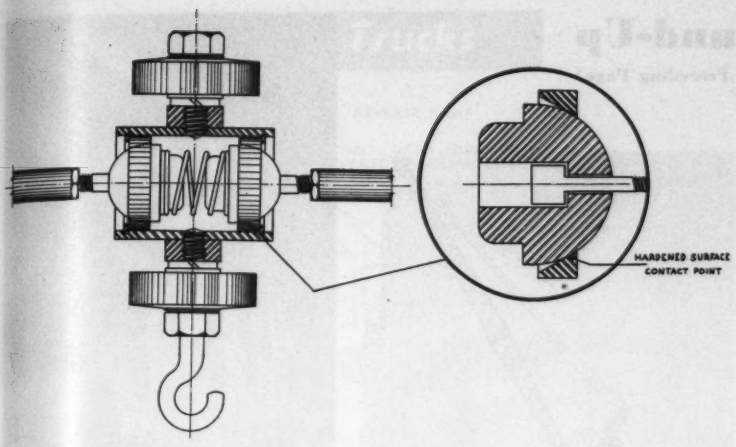
Circle 115 on Service Card, Page 35



The Raymond Corp.

Converging conveyor lines served by elevating table with revolving top, which can be locked in a fixed position

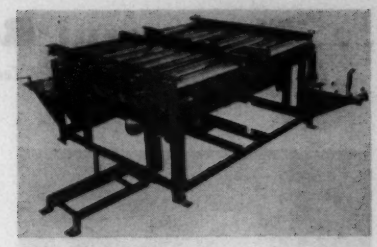
Circle 119 on Service Card, Page 35



Landahl Chain Conveyor Co.

Carburizing the sock and ring assembly eliminates the need of any lubrication throughout the entire system, it is claimed. Suitable for oven conveyor service to 700 deg. F, or for handling products easily damaged by grease

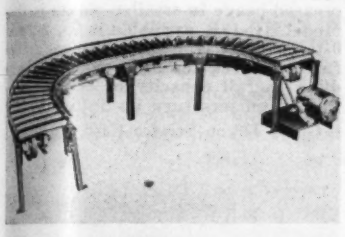
Circle 120 on Service Card, Page 35



Alvey Conveyor Co.

Transfer station automatically raises packages from one line to the other by an air cylinder. Has limit switch

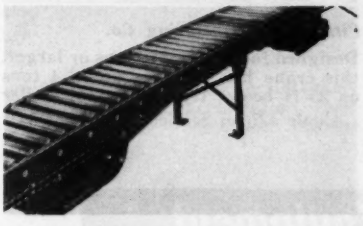
Circle 123 on Service Card, Page 35



Alvey Conveyor Co.

A 180-deg. curve of the live roller type; packages transported around the length of the completely level curve

Circle 121 on Service Card, Page 35



The Rapids-Standard Co., Inc.

Take up (left) and the drive sections (right) can be mounted separately at any point beneath the channel frame

Circle 122 on Service Card, Page 35

Sage Equipment Co.

Products being conveyed on straight sections of conveyors can be diverted at any angle or pass straight across

Circle 124 on Service Card, Page 35

Cranes & Hoists

OVERHEAD crane systems that can handle diversified types of products, in storage and intra-plant handling, where space is at a premium, have increased their effectiveness and provided wider usage.

Attachments, as varied as those for the fork truck, are being developed for overhead bridge cranes as well as tractor-, truck-, and locomotive-mounted boom cranes.

Lightweight metals, compact designs, higher capacities and greater push-button mobility are improvements noted in the manufacture of hoists for the smaller plant or warehouse, or where close quarters require simplified mechanism.

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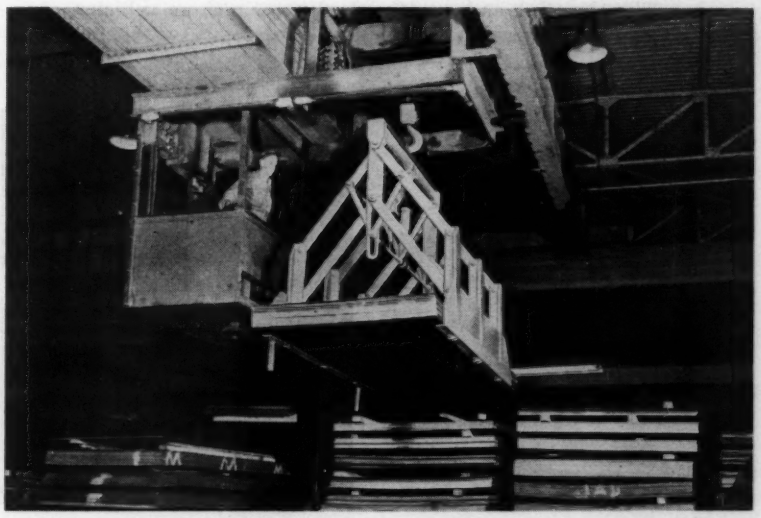


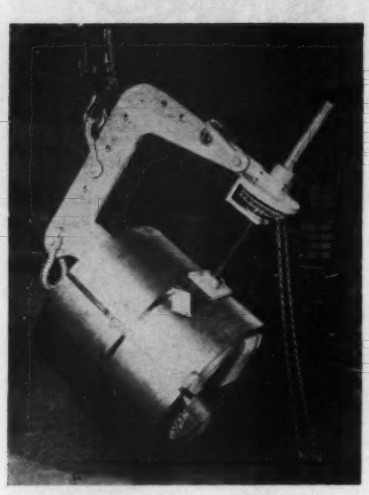
Jaeger Machine Co.

Crane-operated automatic sheet lifter uses only crane man with one man below to lay stringers. No men needed on the ground when transferring from warehouse stockpile to shop. Lifter closes by tong action as it is hoisted

Circle 125 on Service Card, Page 35

. . . Equipment Round-Up

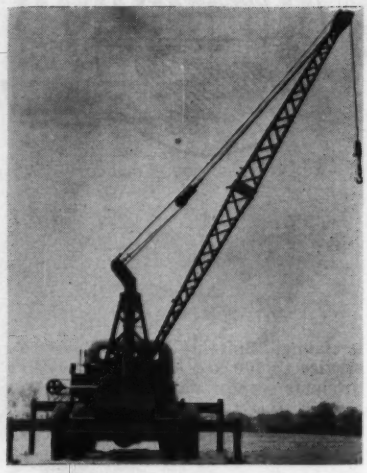
(Continued from Preceding Page)



Dixon Automatic Tool, Inc.

A 15,000-lb capacity coil handler for lifting and turning coils up to 48 in. wide to a 90-deg angle as crane lifts

Circle 126 on Service Card, Page 35



Pitman Manufacturing Co.

Designed for trucks 2½ tons or larger, this crane has capacity up to 4 tons on 25 ft boom; truck can haul trailer

Circle 127 on Service Card, Page 35

Ruger Equipment Co., Inc.

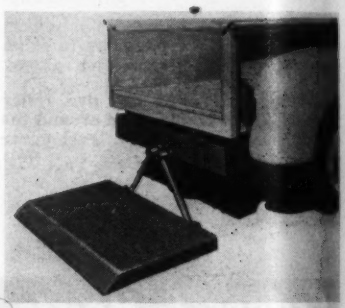
Typical of floor cranes finding increased usage in smaller plants is this Model HP-18B, available in 1-, 2-, and 3-ton capacities. Hand pump regulates fulcrum block for easy one-man handling to full capacity of crane. "No-tip" stabilizers turn up automatically

Circle 128 on Service Card, Page 35

Elevating Equipment

PORTABILITY is one of the chief concerns of designers in the elevating equipment field. Hydraulic machine-set-up platforms can be either stationary or portable. Warehousing cumbersome lengthy material, like steel piping, has become more practicable with a portable hydraulic lift.

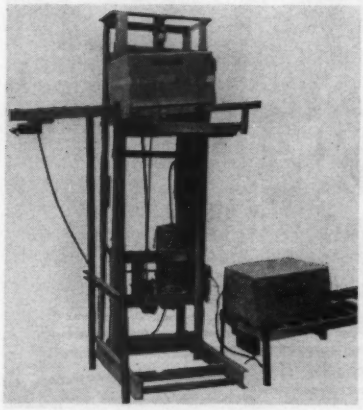
The elevating end-gate for the lighter pick-up vehicles is finding increased usage.



Master Vibrator Co.

Adaption of this lift gate, 1,000-lb capacity, to smaller ½-, ¾-, and 1-ton trucks of stake, platform or pick-up body type is boon to light hauls

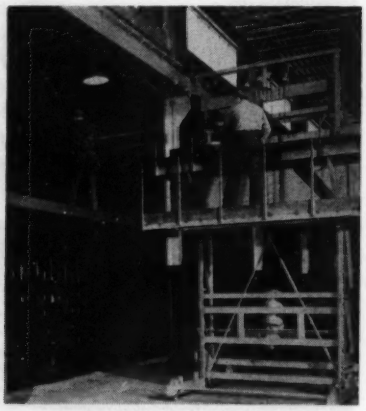
Circle 131 on Service Card, Page 35



West Bend Equipment Corp.

This elevator, fitted with solenoid-operated selectors, can accept or pass-by parts or packages according to weight or size; also reverses operation

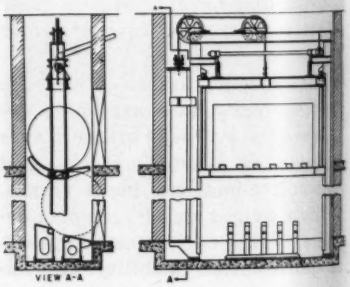
Circle 129 on Service Card, Page 35



West Bend Equipment Corp.

A portable, electric-powered bin loading elevator, push-button controls on elevator and floor level, 2-ton capacity, working height runways on both sides

Circle 130 on Service Card, Page 35

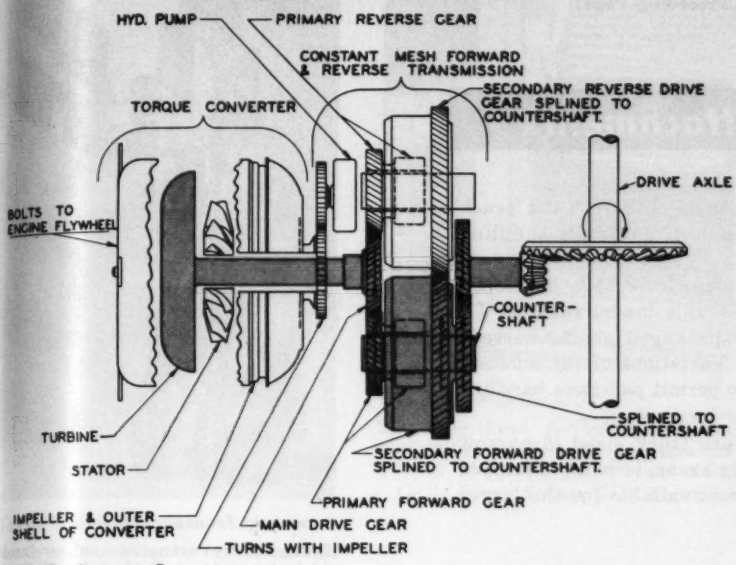


The Gifford-Wood Co.

A powerless drop mechanically lowers cylindrical loads like barrels, drums, rolls of cloth, from one floor to another and discharges automatically

Circle 132 on Service Card, Page 35

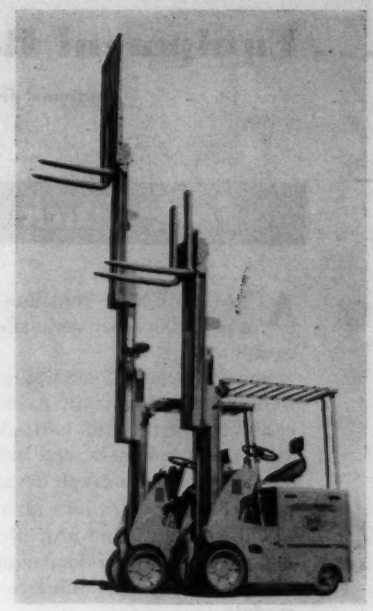
Fork Trucks



Clark Equipment Co.

Hydratork Drive, new automatic transmission for gas-powered fork trucks, eliminates gear clashing during gear engagement, reducing maintenance costs. Smoother acceleration, controlled "inching," effortless shifting

Circle 133 on Service Card, Page 35



Automatic Transportation Co.

Mast heights have become "triple telescopic," tiering to 198 in., by fork trucks of standard 83-in. overall height compared to 132-in. tiering done by similar truck (right) of same capacity

Circle 137 on Service Card, Page 35

Yale & Towne Manufacturing Co.

A low-clearance, narrow-width "Safety Silhouette" truck centralizes controls, and protects the driver's head

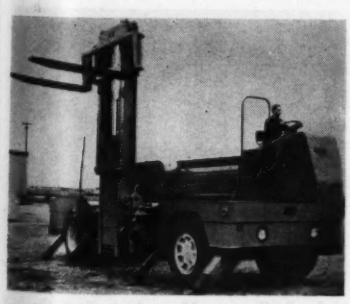
Circle 134 on Service Card, Page 35

GAS and electric industrial truck manufacturers introduced new models—both larger and smaller—to fit new requirements. A greater number of outrigger, or straddle type, trucks for stand-up operation where narrow aisles are required are available. Double and triple telescopic lifts increased high-stacking possibilities.

A wider variety of power units, such as diesel-electric, straight diesel, gasoline-electric, L-P gas are offered. Greater accessibility to power units—for easier maintenance and repairs was designed into many lines and models.

More thought is being given to appearance, resulting in streamlined equipment for companies where industrial trucks are seen by the general public, like hotels, and department stores.

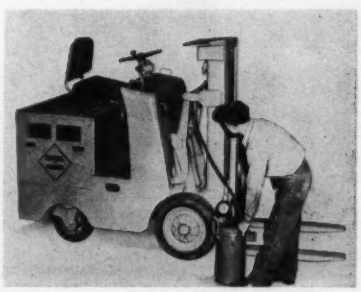
(Please Turn Page)



Baker-Raulang Co.

Side-loading fork truck and load carrier designed especially to stack or haul long, bulky loads in 12-ft. aisles

Circle 135 on Service Card, Page 35



Elwell-Parker Electric Co.

Centralized lubrication prevents starving and over-lubrication, resisting bearing wear and reducing waste

Circle 136 on Service Card, Page 35

Automatic Transportation Co.

"Dynamotive" gas-powered industrial truck with electric transmission and new streamlined styling for eye appeal

Circle 138 on Service Card, Page 35

. . . Equipment Round-Up

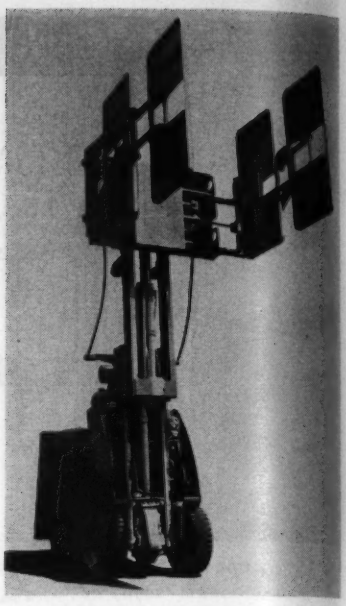
(Continued from Preceding Page)

Fork Truck Attachments

ATTACHMENTS continue to make the fork-lift truck one of the most versatile pieces of materials handling equipment.

Several types of clamping devices have been developed to handle products in palletless unit loads, such as TV cabinets, cartons of bottled or packaged goods, barrels, drums, wooden cases, and bales. Variations of the scissors-like lever or pantograph device to permit palletless handling in boxcars and trailers also are increasing.

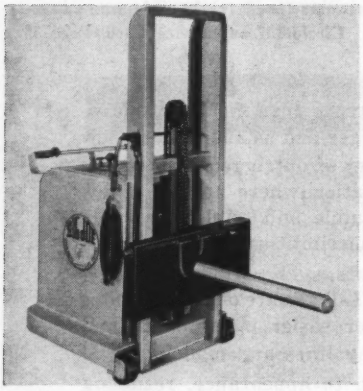
The smaller hand-propelled fork truck, used in narrow aisles or in limited floor capacity areas, is being equipped with attachments similar to those available for the larger models.



Automatic Transportation Co.

Hydraulically actuated, rubber-faced steel clamp for palletless handling of crated TV sets and similar packages

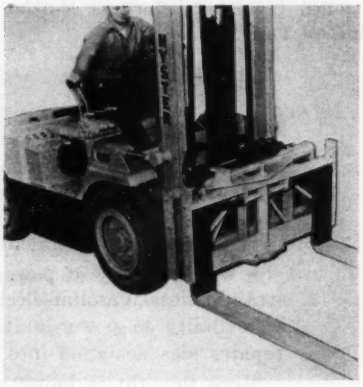
Circle 141 on Service Card, Page 35



Big Joe Manufacturing Co.

Roll-handling attachment interchangeable with forks or ram attachment on this versatile 1,000 lb hand lift truck

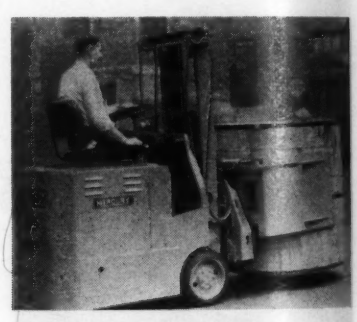
Circle 139 on Service Card, Page 35



Hyster Co.

Swing shift can maneuver forks instead of truck, fingertip hydraulic controls; shifts when moving or still

Circle 140 on Service Card, Page 35



Mercury Manufacturing Co.

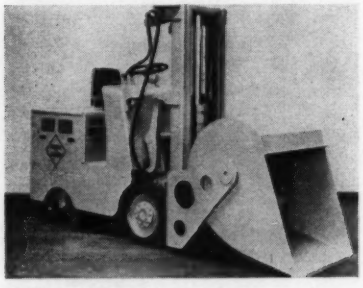
Hydraulic clamp for picking up hogsheads resting horizontally on floor, without blocking or special tilting

Circle 142 on Service Card, Page 35

Towmotor Corp.

Rollers fixed to edge of hollow members that fit over standard forks, reduce friction of pushing off long pieces

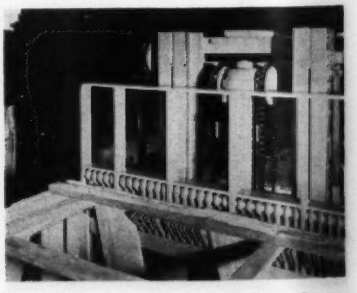
Circle 143 on Service Card, Page 35



Elwell-Parker Electric Co.

A 25-cu ft scoop with 3200-lb capacity, anti-friction bearings, cylinder moves unit from loading to carrying

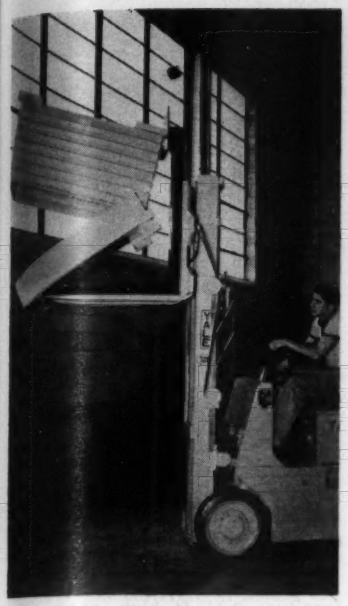
Circle 144 on Service Card, Page 35



Yale & Towne Manufacturing Co.

Automatically lifts most kinds of open crates; no pallets, skids or forks needed, holds two large or four small

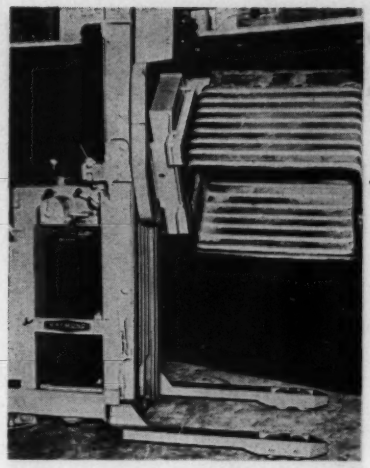
Circle 145 on Service Card, Page 35



Yale & Towne Manufacturing Co.

Controlled dumping to maximum lift range; raises rear end of box, permits dumping at same height as forks

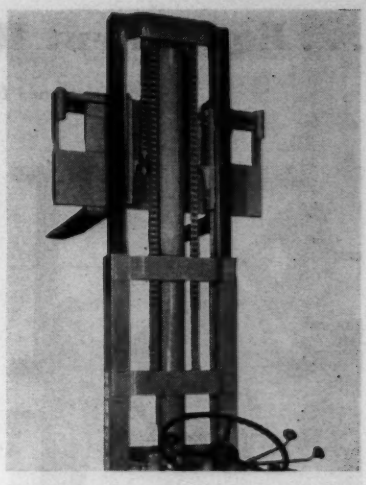
Circle 146 on Service Card, Page 35



The Raymond Corp.

Revolving head for roll-over boxes containing small parts for machine feeding. Operates in narrow aisles

Circle 149 on Service Card, Page 35



Towmotor Corp.

Hoist protection for trucks used in scoop operations against dust or abrasives, plunger always shielded

Circle 150 on Service Card, Page 35

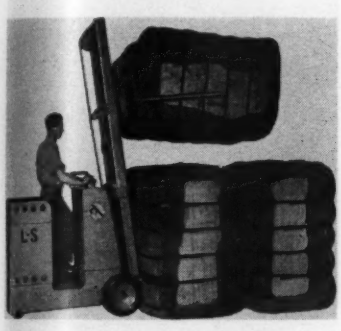
Pallets

GREAT interest is being centered on the expendable, single use pallet. Various new forms made of wood, cardboard, fibreboard, appeared during the last 12 months.

A standard size 40 x 40 in. corrugated fibreboard, weighing less than 5 lb, was claimed to have held up under 11,000 lb in engineering tests.

Two warehousemen introduced new pallets—one, an electric step-climbing pallet, the other, a space-saving furniture pallet.

In 1953, for the first time, a railroad granted the same low rate on pallets returned with empty containers used in brewing and soft-drink bottling that applied to return shipments of containers.



Lewis-Shepard Products, Inc.

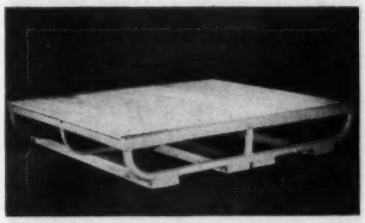
Lifts, stacks and unpiles bales unsupported; clamps used as forks for handling pallet, skid or bin loads

Circle 147 on Service Card, Page 35

Yale & Towne Manufacturing Co.

Palletless payloads possible with this hydraulic pusher, steel pallet plate and an adaptor to fit over the forks

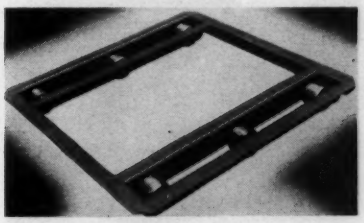
Circle 148 on Service Card, Page 35



Econoweld Corp.

Assembled without single fastener; hardwood deckboards held in welded steel framing, can remove by hand

Circle 151 on Service Card, Page 35



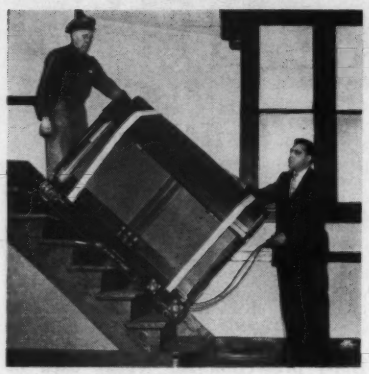
Frank L. Robinson Co.

Pallet roller with crowned rollers for easy handling and floor protection, are available in 30-48 in. sq. sizes

Circle 152 on Service Card, Page 35

. . . Equipment Round-Up

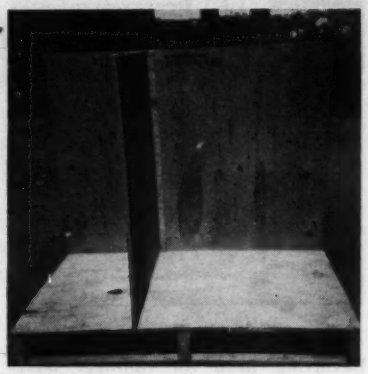
(Continued from Preceding Page)



Blue Van & Storage Co.

Electric pallet that climbs stairs, continuous belt mounted on rollers, palm size push-button panel control

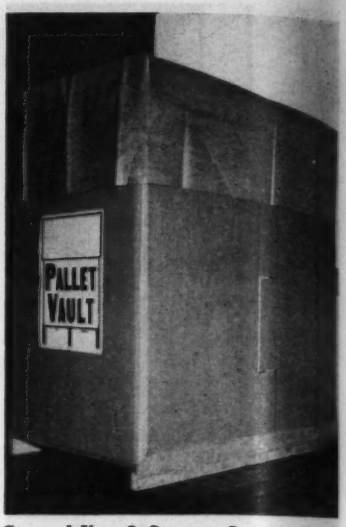
Circle 153 on Service Card, Page 35



Hammerslag Equipment Co.

Off-center removable plywood spacers permit warehousing of various sizes crates and boxes on the same pallet

Circle 154 on Service Card, Page 35



General Van & Storage Co.

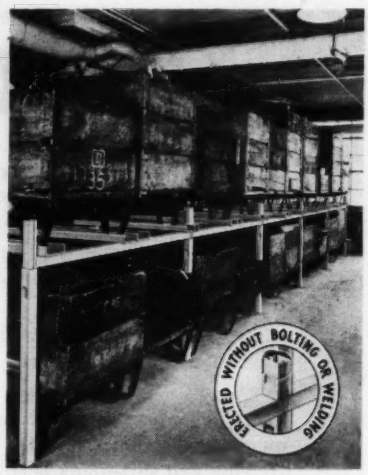
Dustproof container placed on pallet, 42 by 72 in., kraft paper top; stacks furniture 9-11 ft high, saves space

Circle 155 on Service Card, Page 35

Racks

GREATER stacking heights, particularly for non-palletized material, are possible with the new racks that appeared on the market during the past 12 months. They are primarily of heavier construction. A collapsible rack, and various types of easily dismountable framing were available.

A new type rack for order selection brings merchandise to the stockman, assures rotation, and is adjustable to cartons or cases.



American Metal Products Co.

Square-tubed skid racks, erected without bolting or welding; tiered to any height; can accommodate two skids

Circle 157 on Service Card, Page 35

Ainsworth Manufacturing Co.

Mobile rack holds tote boxes; can be adjusted to handle varied tote sizes, boxes removable for production work

Circle 158 on Service Card, Page 35

Palmer-Shile Co.

Book rack for drying or curing material requiring separation; unit can be wheeled by hand, carried by lift truck

Circle 156 on Service Card, Page 35

Leebaw Manufacturing Co.

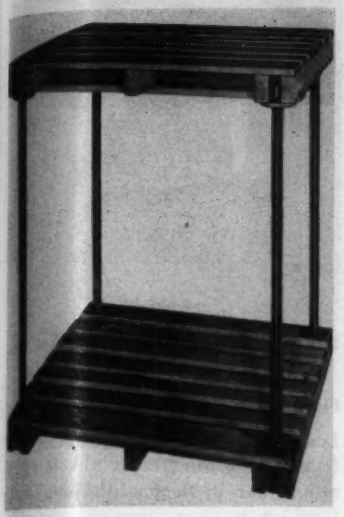
Flanged legs securely hold material not easily unitized, steel side frames give added protection, also adjustable

Circle 159 on Service Card, Page 35

Acme Pallet Co., Inc.

Select-O-Mat assures rotation of merchandise, fed through rear where catwalk and conveyor located, saves space

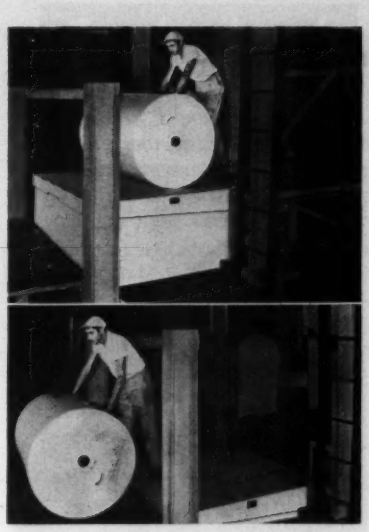
Circle 160 on Service Card, Page 35



Stak-Mor Sales Co.

Vertical supports and a self-aligning system permit materials of almost any size or shape to be stored any height

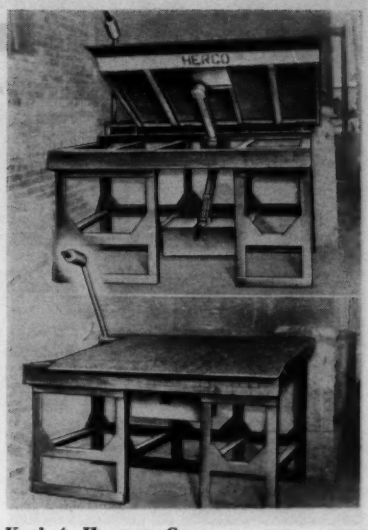
Circle 161 on Service Card, Page 35



The Hamilton Tool Co.

Portelvator, bulk handling ramp, load capacity 6,000-lb, lift 21½ in., push-button operated, 3-in. tilt movement

Circle 163 on Service Card, Page 35



Karl A. Herman Co.

Self-supporting ramp for limited dock space; can be welded or lagged into concrete or wood; moved any time

Circle 164 on Service Card, Page 35

American Metal Products Co.

Self-stacking rack. Ends fold inside the rack frame when empty or when being shipped; wide range of sizes

Circle 162 on Service Card, Page 35

Rotary Lift Co.

Oildraulic transfer bridge provides a shortcut across tracks, lowers to become integral part of the track system

In addition to the recessed rail-type above, one rotates, fits between tracks when unused, one is drawbridge type

Circle 165 on Service Card, Page 35

Ramps

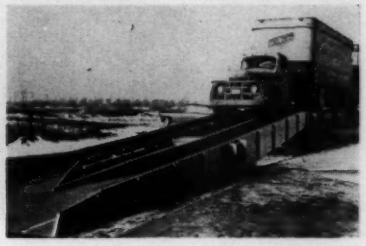
LIGHTWEIGHT ramps that withstand heavy capacities, yet be manually transported, is a growing trend. Other types are designed for towing by fork truck. A turntable ramp bridges tracks or aligns with them. Another type automatically raises and lowers when wheels touch a switch bar.

(*Please Turn Page*)

Rowe Methods, Inc.

Adjust-A-Truck provides ramp facilities for trucking by raising truck to desired height, permits level loading

Circle 166 on Service Card, Page 35



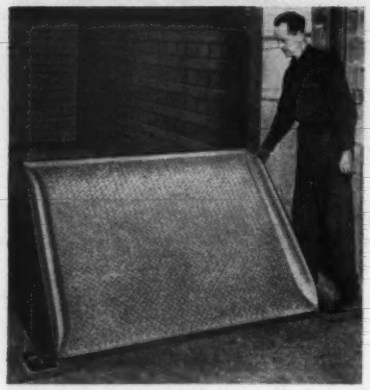
Magnesium Company of America

Traileramp, 45-ft long portable unit, weighing only 4500 lb, manually operated hydraulic system lowers, raises

Circle 167 on Service Card, Page 35

. . . Equipment Round-Up

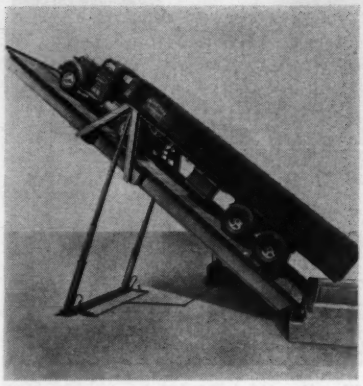
(Continued from Preceding Page)



Magline Inc.

Constructed of strong, but lightweight magnesium, raised and lowered by one man, self-adjusting, no power needed

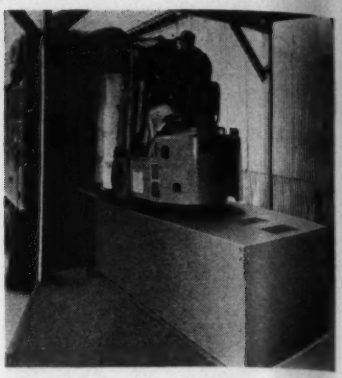
Circle 168 on Service Card, Page 35



Link-Belt Co.

Hydraulic truck dumper for trucks and semi-trailers up to 54 ft long with 80,000 lb gvw; ramp raises 40-deg

Circle 169 on Service Card, Page 35



Field Engineering Co.

Load-O-Matic, automatic loading platform, starts when front wheels touch switch bar in floor of loading platform. A leveling ramp automatically stops platform when platform is in same level plane as truck floor and bridges gap between, whether truck floor is above or below loading dock

Circle 170 on Service Card, Page 35

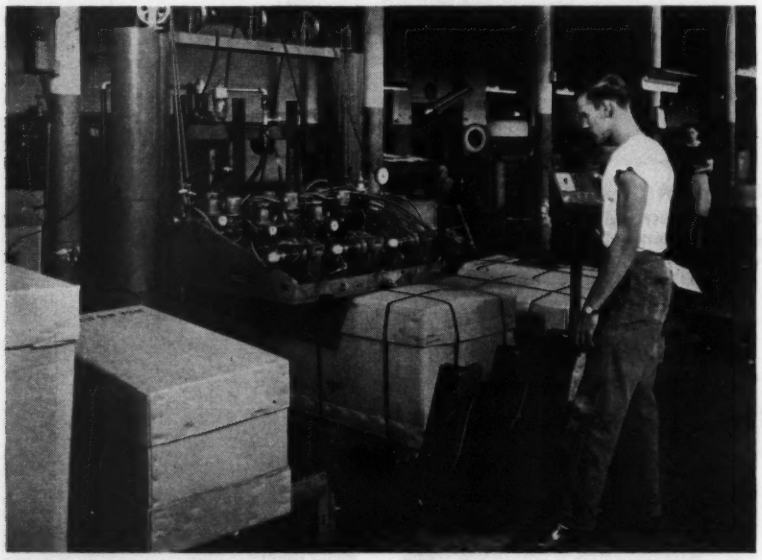
Strapping

NEW methods of applying strapping were introduced, such as an automatic machine which tensions, cuts and joins the ends with spot welds. Another type automatically compresses the bale or carton, feeds out three straps simultaneously in correct lengths and joins the ends.

In contrast, more simplified strapping machines, portable units and lightweight electric powered and hydraulic tools were developed.

Unitized loads secured with strapping is becoming a more common practice. Adoption of various types of strapping to prevent damage to lcl loads is increasing among U. S. railroads.

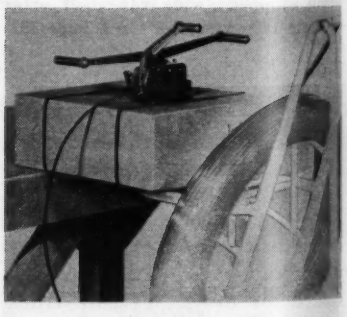
Strapping is also being used extensively to brace ltl shipments. Increasing pallet durability with strapping was introduced.



Acme Steel Co.

This machine moderately compresses a package and simultaneously supplies up to three steel straps at 15-in. intervals. Operated by one man at a push-button control board (right), the air gages are in full view of operator

Circle 172 on Service Card, Page 35



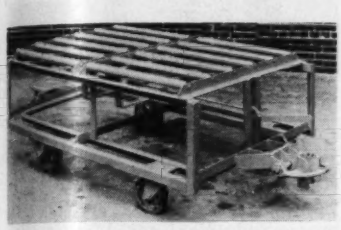
Inland Wire Products Co.

Inland Seal-Less strapping machine tensions, cuts to exact length, and interlocks the overlapping ends securely

Circle 171 on Service Card, Page 35

Trailers

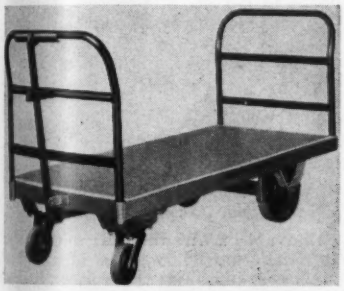
CONVEYORIZED industrial trailers, easily transported by tractor or fork truck, are being integrated into conveyor lines. A brake mounted on the push handle of another type trailer permits safer wheeling on inclines and ramps. A caster-steer trailer with 8,000-lb capacity adapts to a trackless system. Interchangeable handles, non-marking rubber bumpers, and magnesium trailers appeared in greater number.



Mercury Manufacturing Co.

Two roller conveyor sections, 30 in. from floor, feature of this 3,000-lb capacity trailer, fits conveyor lines

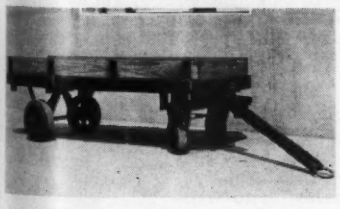
Circle 173 on Service Card, Page 35



Towsley Trucks, Inc.

Hand-O-Matic, a brake located on push handle, stops floor truck instantly when operator removes hand from control

Circle 174 on Service Card, Page 35



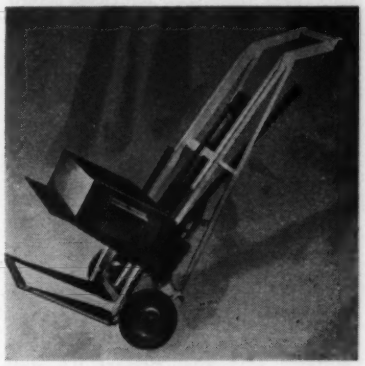
Mercury Manufacturing Co.

Controlled caster-steer trailer, 8,000-lb capacity. C-type couplers on rear permit use in a trackless train system

Circle 175 on Service Card, Page 35

Trucks, hand

THE hand truck, indispensable for many types of handling, is becoming more available in lightweight magnesium and aluminum. Several new types were introduced during the past 12 months. Caterpillar rubber treads on one type enable easier movement on stairs or truck steps. One manufacturer combined hand lift and hand truck for raising loads from street level to truck bed or warehouse floor to storage rack.



Grand Specialties Co.

Powerful hydraulic lift is built into reinforced 2-wheel hand truck; 4-speed mechanism fits speed to weight of load

Circle 176 on Service Card, Page 35

Trucks, pallet

PALLET trucks under 2,000 lb have been designed with the same type lifting mechanism of heavier models. A combination pallet load lift to handle either single or double faced pallets is in production. Another manufacturer introduced a truck that not only handles pallets and skids, but skids with two different underclearances. It is equipped with a double-hinged superframe which enables the use of one truck for three handling operations, rather than three separate trucks.

(Please Turn Page)

Boyertown Auto Body Works

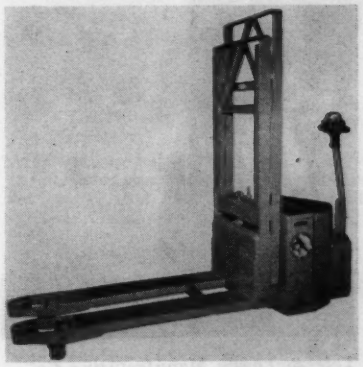
A special caterpillar belt tread rotates about two sets of wheels 18-in. apart; 650-lb loads handled on stairs

Circle 177 on Service Card, Page 35

Magline Inc.

Magnesium hand truck with fully retractable third wheel. When wheel extended, operates in 3-point position

Circle 178 on Service Card, Page 35



Lewis-Shepard Products, Inc.

Electric pallet truck with a double-hinged super frame enables one truck to handle pallets, two sizes of skids

Circle 179 on Service Card, Page 35

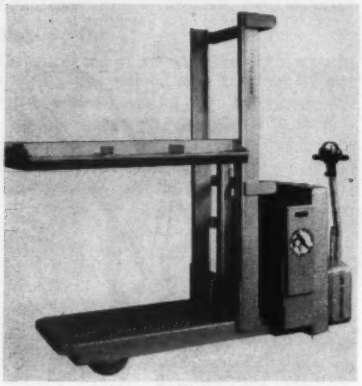
. . . Equipment Round-Up

(Continued from Preceding Page)

Trucks, platform

PLATFORM trucks are becoming as versatile in handling operations as the fork truck. They are available in both walkie or rider types, three or four wheels, one or two platforms. They can maneuver in narrow aisles, operate in low clearances, turn in short radius, and handle multiple storage and warehouse jobs.

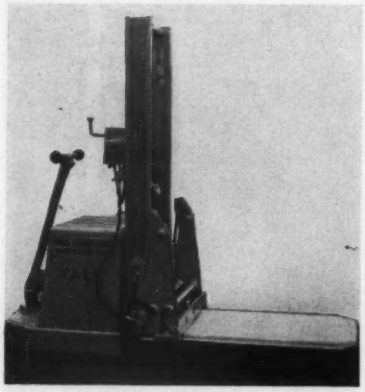
One model is equipped with a revolving crane. A layer of sponge rubber mounted on the underside of the top platform of another model prevents fragile and slippery packages from falling.



Lewis-Shepard Products, Inc.

An inverted platform covered with a heavy layer of sponge rubber for safe transport of fragile or slippery items

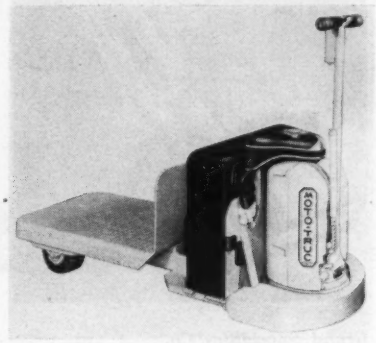
Circle 180 on Service Card, Page 35



Yale & Towne Manufacturing Co.

A hydraulic pusher on this truck has double-acting cylinders which can push dies off slider bed or pull them on it

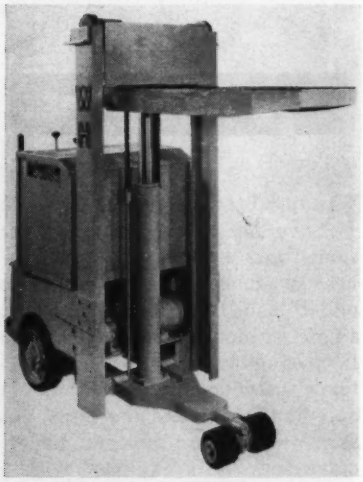
Circle 184 on Service Card, Page 35



Moto-Truc Co.

A "walkie" type platform truck, new time delay, slow-speed switch, eliminates possibility of starting in high

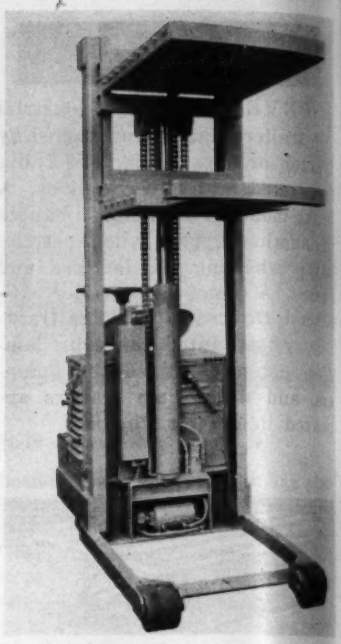
Circle 181 on Service Card, Page 35



Wright-Hibbard

Stand-up rider type, single lift or telescopic types, 2-4,000-lb capacity. Separate electric motor operates lift

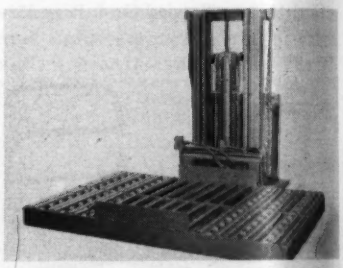
Circle 185 on Service Card, Page 35



Market Forge Co.

Two-platform truck for servicing large presses; new die removed from storage on top; old die from press on bottom

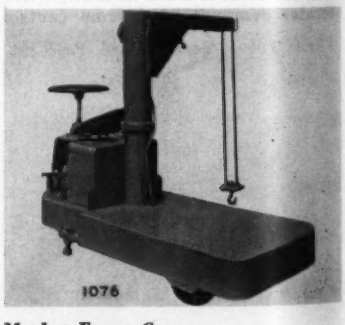
Circle 182 on Service Card, Page 35



Lewis-Shepard Products Inc.

Removable hydraulic roller platform to handle unwieldly boxes of stainless steel or aluminum; controls on handle

Circle 183 on Service Card, Page 35



Market Forge Co.

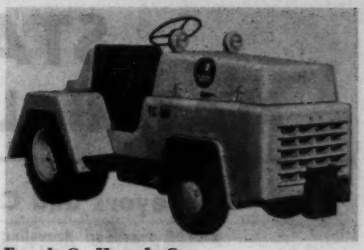
Platform truck with revolving crane handles molds and similar equipment; 2,000-lb capacity, controlled lowering

Circle 186 on Service Card, Page 35

Trucks, special

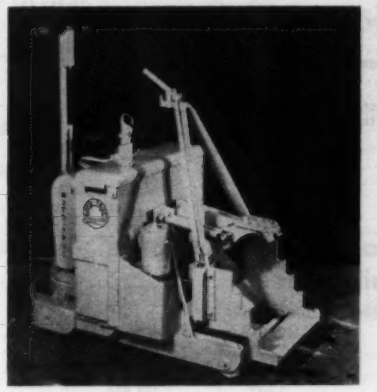
RADIO remote controlled industrial tractors, lightweight electric utility trucks, a walkie tractor that adjusts to any height trailer, a sweeper with scoop attachment, and an end-loader for lumber and similar long material are only a few of the unique types of handling equipment designed for special user needs.

Hyster Co.
End-loading Straddle Truck that can handle lumber, pipe, palletized items on hydraulically-actuated load hooks
Circle 187 on Service Card, Page 35



Frank G. Hough Co.
Payloader towing tractor. With dual-range, full reversing transmission, which has been provided with Solenoid vacuum-actuated tail-shaft brake which stops rotation of transmission while shifting. Operator has push-button brake controls on shift lever
Circle 190 on Service Card, Page 35

Barrett-Cravens Co.
Radio-remote controlled movement of electric truck, Tractor Ox, operated by push-button unit on driver's belt
Circle 188 on Service Card, Page 35

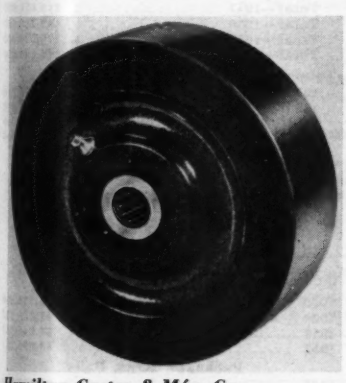


The Moto-Truc Co.
Grip-All tractor with two clamping jaws attach to majority of 4-wheel trailers regardless of underclearance
Circle 189 on Service Card, Page 35

Autoette, Inc.
Electrically-powered pickup trucks designed for light hauling, ¼- and ½-ton types, operate at 1/5-cent per hr
Circle 191 on Service Card, Page 35

Wheels & Casters

BASIC wheeled equipment continued to answer many material handling needs in specific cases. New sealed bearings, better tire compounds and the use of spring-loaded casters enlarged the usefulness of this type of equipment. A moulded plastic wheel, claimed to outwear metal wheels in many operations, was put in production.



Hamilton Caster & Mfg. Co.
A moulded plastic wheel claimed to be noiseless, non-sparking, shock-absorbent, outwear metal in many operations
Circle 192 on Service Card, Page 35

The Aerol Co.
A special anti-shimmy brake for high speed operation without vibration is feature of this 16-in. pneumatic unit
Circle 194 on Service Card, Page 35

Neoprene seals keep lubricant in the raceways and seal out destructive dirt, water, chemicals. Five types available; rated 1,200 lb per caster

The Rapids-Standard Co.
Circle 193 on Service Card, Page 35

Editor's Note: On the preceding pages, we've presented a brief review of new developments in materials handling equipment brought to our attention during the past 12 months. Space limitations governed the number of items shown, and availability of illustrative material, rather than qualitative preference, influenced the use of the accompanying illustrations.

Names of additional manufacturers of the types of equipment shown may be found conveniently listed alphabetically in the WHERE-TO-BUY section in the February issue of your DISTRIBUTION AGE.

Industrial and institutional plate-mounted casters have wheels with replaceable soft rubber tread tires. Bolted steel disc-type construction.

The Bassick Co.
Circle 195 on Service Card, Page 35

STATISTICAL DATA
MATERIALS HANDLING EQUIPMENT

Conveyors and Conveying Equipment

Except overhead traveling cranes and monorail systems

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Farm elevators, portable		
Single chain	18,732	$ 2,888,000
Double chain	18,032	5,931,000
Auger type	19,250	2,356,000
Farm elevators, stationary	1,301	603,000
Parts and attachments, and those not reported by type	....	4,363,000
Conveyors and conveying systems	....	142,573,000
Gravity conveyors (skate wheel and roller)	....	10,262,000
Power conveyors (excluding overhead trolley systems, pneumatic tube systems, and portable conveyors)	....	17,604,000
Overhead trolley conveyor systems	....	10,904,000
Pneumatic tube systems (incl. foot-power units)	....	2,200,000
Portable conveyors (except farm)	....	14,583,000
Other conveyors and conveying systems	....	87,020,000
Parts, attachments, and accessories sold separately	....	34,754,000
Conveyors and conveying equipment, not reported by type	....	3,364,000
Total—1947	....	**$196,832,000**
Total—1950	....	**$181,137,000**
Total—1951	....	**$254,732,000**
Total—1952	....	**$280,737,000**

Shipments of Overhead Traveling Cranes and Monorail Systems

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Overhead traveling cranes:		
Electric	2,149	$ 27,987,000
Hand Power	1,042	1,253,000
Monorail systems	....	7,997,000
Total—1947	....	**$ 37,242,000**
Total—1950	....	**$ 59,559,000**
Total—1951	....	**$ 92,889,000**
Total—1952	....	**$126,274,000**

Industrial Trucks, Tractors, Trailers & Portable Elevators

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Powered trucks, operator walking	7,469	$ 8,053,000
Powered trucks, operator riding	20,385	66,437,000
Fork trucks	17,943	56,970,000
Electric (storage battery and gasoline-electric powered)	2,522	15,212,000
Gasoline powered	14,421	41,758,000
Other trucks	2,442	9,467,000
Electric (storage battery and gasoline-electric powered)	1,300	5,667,000
Gasoline powered	1,142	3,800,000
Tractors	2,460	3,890,000
Electric (storage battery and gasoline-electric powered)	199	367,000
Gasoline powered	2,261	3,523,000
Portable elevators[1]	4,653	3,162,000
Hand trucks and trailers	....	29,430,000
Hand lift	....	8,373,000
Other[2]	....	21,057,000
Parts, attachments, and miscellaneous equipment, sold separately[3]	....	41,572,000
Industrial trucks and tractors, not reported by type	....	4,210,000
Total—1947	....	**$156,754,000**
Total—1949	....	**$151,573,000**
Total—1950	....	**$166,259,000**
Total—1951	....	**$285,248,000**
Total—1952	....	**$322,166,000**

[1] Does not include farm elevators. [2] Includes two-wheel, four-wheel, dollies, and platform trucks. [3] Includes pallets and skids.

Shipments of Industrial Electric Trucks and Tractors*

	1953	1952	1951	1950	1949
Jan.	704	658	440	199	384
Feb.	779	681	461	183	370
Mar.	832	702	595	229	347
Apr.	732	643	397	204	139
May	677	652	464	262	300
June	945	648	604	268	304
July	673	394	538	199	188
Aug.	626	564	591	227	305
Sept.	797	516	447	263	336
Oct.	877	588	587	290	354
Nov.	677	622	728	242	327
Dec.	673	741	673	291	379
Total	8,992	7,409	6,525	2,808	3,980

*Industrial Truck Association. Data represents 75 to 80 per cent of industry.

Shipments of Paper Product Shipping Containers

Industry Div., Bureau of the Census

Class of Products	Value at Plant
Shipping Sacks	
Total—1947	$ 153,201,000
Total—1950	$ 188,226,000
Total—1951	$ 251,383,000
Total—1952	$ 234,011,000
Shipping Containers	
Total—1947	$ 833,858,000
Total—1950	$ 926,927,000
Total—1951	$1,160,363,000
Total—1952	$1,068,745,000
Folding Boxes and Cartons	
Total—1947	$ 401,447,000
Total—1950	$ 508,778,000
Total—1951	$ 667,261,000
Total—1952	$ 626,153,000
Set-up Boxes	
Total—1947	$ 210,671,000
Total—1950	$ 199,760,000
Total—1951	$ 226,814,000
Total—1952	$ 234,036,000
Total—Sacks, Containers, Boxes	
1947	$1,599,185,000
1950	$1,823,691,000
1951	$2,297,705,000
1952	$2,369,809,000

Shipments of Steel Shipping Containers

(In Number of Units)

Barrels and Drums	
1950	36,778,000
1951	41,259,333
1952	34,246,353
1953	33,895,301
Packages, Kegs, Pails	
1950	69,157,330
1951	76,735,370
1952	64,068,727
1953	69,586,797

Value of Shipments of Excavating and Earthmoving Equipment

Industry Division, Bureau of the Census

Class of Product	1953*	1952	1951	1950	1949
Power cranes and shovels	$146,687,000	$199,321,000	$180,680,000	$109,006,000	$ 89,204,000
Road construction and maintenance machinery	97,469,000	159,592,000	151,779,000	117,540,000	96,332,000
Construction machinery for mounting on tractors	61,535,000	74,732,000	64,816,000	58,769,000	38,177,000
Track laying tractors†	262,496,000	280,841,000	263,579,000	223,042,000	196,632,000
Wheel-type tractors (contractors off-highway type)	33,032,000	59,847,000	55,233,000	24,769,000	12,499,000
Trucks, truck tractors, and trailers, off-highway types	25,188,000	32,805,000	36,840,000	22,356,000	N.A.
Portable well and blast hole drills	6,042,000	6,769,000	5,813,000	4,472,000	6,774,000
Other excavating and earth moving equipment	1,448,000	6,471,000	6,208,000	1,692,000	(1)
Total	$638,947,000	$820,929,000	$764,958,000	$314,325,000	$231,088,000

N.A.—Not available. (1)—Included in road construction and maintenance machinery for mounting on tractors.

*—First nine months.

1

1-A

1-

1-

DA MASTER CHART OF BASIC MATERIALS HANDLI

ARRANGED ACCORDING TO THEIR FUNCTIONAL OPERAT

D. O. HAYNES, *Consulting Industrial Engineer,* **DISTRIBUTION AGE**

1 Haulage Systems

Horizontal motion over fixed or variable level or nearly level routes by pulling or pushing on surface riding vehicles

1-A—Fixed Routes

1-A-1—Truck Dragging Systems
- a—Overhead Trolley Type
- b—In-Floor Type

1-A-2—Industrial Railroads
- a—Locomotives
- b—Cars
- c—Winches (See 2-B-4)

1-B—Variable Routes

1-B-1—Industrial Hand Trucks
- a—Dollies
  - 1—Furniture
  - 2—Lever
  - 3—Milk Case
  - 4—Pallet & Skid
  - 5—Paper Roll
  - 6—Roller
- b—Wheelbarrows
- c—Two Wheel
  - 1—Appliance
  - 2—Bag
  - 3—Baggage
  - 4—Barrel
  - 5—Cable Reel
  - 6—Cannery
  - 7—Carboy
  - 8—Caterpillar
  - 9—Chisel
  - 10—Combination
  - 11—Cotton
  - 12—Cylinder Tank
  - 13—Lift
  - 14—Stevedore
  - 15—Tote Box
  - 16—Utility
  - 17—Warehouse
    - Eastern
    - Western
- d—Three-Wheel
- e—Non-Lift Platform
  - 1—Baggage
  - 2—Box
  - 3—4-Wheel
  - 4—5th Wheel Steer
  - 5—6 Wheel

1-B-2—Skid Platforms

See 5-A—Skid Systems

1-B-3—Powered Industrial Trucks
- a—Wheelbarrows
- b—3 Wheel
- c—Non-Lift Platform

1-B-4—Trackless Trains
- a—Industrial Tractors
  - 1—Light Duty
  - 2—3-Point
  - 3—4-Point
- b—Industrial Trailers
  - 1—Balanced
  - 2—Caster Steer
  - 3—4-Wheel Steer
  - 4—5th Wheel Steer

2 Elevating Systems

Vertical Motion over fixed vertical or steeply inclined routes with continuous or with intermittent motion

2-A—Continuous Motion

2-A-1—Vertical-Type Conveyors
- a—Arm
- b—Bucket
- c—Push Bar
- d—Suspended Carriages

2-B—Intermittent Motion

2-B-1—Fixed Arm Cranes
- a—Wall
- b—Floor

2-B-2—Fixed Arm Derricks

2-B-3—Fixed Hoists
- a—Manual
  - 1—Block & Tackle
  - 2—Ratchet
  - 3—Differential
  - 4—Screw Geared
  - 5—Spur Geared
- b—Air
  - 1—Air Cylinder
  - 2—Air Motor
- c—Electric
- d—Whip

2-B-4—Winches
- a—Manual
- b—Electric
- c—Fuel or Steam Engine

2-B-5—Stackers

2-B-6—Levelers

2-B-7—Elevators
- a—Dumbwaiters
- b—Skip Hoists
- c—Freight Elevators

3 Conveying Systems

Horizontal, inclined or declined motions over fixed routes by gravity or by power

3-A—Gravity Systems

3-A-1—Sliding Friction Conveyors
- a—Skids
- b—Chutes
  - 1—Plain
  - 2—Flexible
  - 3—Spiral

3-A-2—Rolling Friction Conveyors
- a—Gravity Wheel
- b—Gravity Roller
- c—Flexible
- d—Gravity Roller Spiral

3-B—Powered Systems

3-B-1—Belt Conveyors
- a—Slide Bed
- b—Roller Bed
- c—Live Roller
- d—Trough

3-B-2—Cable Conveyors
- a—Drags
- b—Overhead Trolley

3-B-3—Chain Conveyors
- a—Apron
- b—Drag
  - 1—Package
  - 2—Bulk Material
- c—Flight
  - 1—Push
  - 2—Roller
- d—Live Roller
- e—Pallet
- f—Slat
- g—Stabilized Tray
- h—Vertical
  - 1—Arm
  - 2—Bucket
  - 3—Push Bar
  - 4—Suspended Carriage
- i—Trolley
  - 1—Overhead
  - 2—In-floor

3-B-4—Portable
- a—Apron
- b—Belt
- c—Bucket
- d—Curvable
- e—Extendable
- f—Flight
- g—Screw

3-B-5—Pneumatic

3-B-6—Screw

4 Transferring Syste

Horizontal, vertical or compo through the air over fixed rout areas with intermittent motion

4-A—Fixed Routes

4-A-1—Monorails
- a—Manually Propelled
- b—Power Propelled

4-B—L

4-B-1—
- a—Stiff
- b—Guy-
- c—Misce
  - 1—Po
  - 2—Sh
  - 3—A
  - 4—Tri

4-B-2—
- a—Jib
  - 1—Wa
  - 2—Co
  - 3—Pil
  - 4—Po
- b—Bridg
  - 1—Ov
  - 2—Ga
    - a—
    - b—
- c—Portal
- d—Power
  - 1—Au
    - a—
    - b—
    - c—
  - 2—Loc

**—For detailed description and basic application of equipment listed here, see following pages. To locate information on a specific piece of equipment, find same index number as shown opposite desired item in boxes above. Applic*

C MATERIALS HANDLING SYSTEMS

O THEIR FUNCTIONAL OPERATION*

Industrial Engineer, **DISTRIBUTION AGE**

ying Systems

lined or declined motions over gravity or by power

4 Transferring Systems

Horizontal, vertical or compound motions through the air over fixed routes or limited areas with intermittent motion

5 Self-Loading Systems

Intermittent motion with machines that pick up, move horizontally, set down and, in some cases, tier loads without other handling. Also known as Unit-Load Systems.

---

iction

iction

piral

3-B—Powered Systems

3-B-1—Belt Conveyors

a—Slide Bed
b—Roller Bed
c—Live Roller
d—Trough

3-B-2—Cable Conveyors

a—Drags
b—Overhead Trolley

3-B-3—Chain Conveyors

a—Apron
b—Drag
  1—Package
  2—Bulk Material
c—Flight
  1—Push
  2—Roller
d—Live Roller
e—Pallet
f—Slat
g—Stabilized Tray
h—Vertical
  1—Arm
  2—Bucket
  3—Push Bar
  4—Suspended Carriage
i—Trolley
  1—Overhead
  2—In-floor

3-B-4—Portable

a—Apron
b—Belt
c—Bucket
d—Curvable
e—Extendable
f—Flight
g—Screw

3-B-5—Pneumatic

3-B-6—Screw

4-A—Fixed Routes

4-A-1—Monorails

a—Manually Propelled
b—Power Propelled

4-B—Limited Areas

4-B-1—Derricks

a—Stiff Leg
b—Guy-Line
c—Miscellaneous
  1—Pole
  2—Shear-Leg
  3—A-Frame
  4—Tripod

4-B-2—Cranes

a—Jib
  1—Wallbracket
  2—Column
  3—Pillar
  4—Portable
b—Bridge
  1—Overhead Travelling
  2—Gantry
    a—Semi
    b—Full
c—Portal
d—Power
  1—Automotive
    a—Crawler
    b—Truck
    c—Wheel
  2—Locomotive

5-A—Skid Systems

5-A-1—Skids

a—Live
b—Semi-Live
c—Dead

5-A-2—Skid Jacks

a—Hand Jack
b—Powered Tractor

5-A-3—Low-Lift Platform Trucks

a—Hand
  1—Mechanical Lift
  2—Hydraulic Lift
b—Powered Hand
  1—Non-Ride
  2—Ride
c—Powered Platform Lift
  1—Non-Ride
  2—Ride

5-A-4—High-Lift Platform Truck

a—Hand Stacker
b—Powered Stacker
  1—Non-Ride
  2—Ride
c—Powered Platform Lift

5-B—Pallet Systems

5-B-1—Pallets

a—Materials
b—Fastenings
c—No. Faces (Decks)
d—Reversibility
e—Stringer
f—No. Entries
g—Special Types
h—Expendability

5-B-2—Low-Lift Fork Trucks

a—Hand
b—Powered, Hand
  1—Non-Ride
  2—Ride

5-B-3—High-Lift Fork Trucks

a—Handstackers
b—Powered Handstackers
  1—Non-Ride
  2—Ride
c—Counter Balanced Powered Handstacker
  1—Non-Ride
  2—Ride
d—Conventional Fork-Lift Trucks

5-C—Other Unit-Load Systems

5-C-1—With Load-Carriers

a—End-Loading Trucks
b—Side-Loading Trucks
c—Overhead Crane Stacker
d—Power Crane Forks

5-C-2—Without Load-Carriers

a—Fork Truck Accessories
  1—Clamps
  2—Cranes
  3—Grabs
  4—Push-Pull
  5—Rams
b—Below-the-Hook Accessories
  1—Grabs
  2—Magnets
  3—Slings

oment, find same index number as shown opposite desired item in boxes above. *Application Guide begins on Page 57. Basic Guide begins on Page 69.*

MATERIALS HANDLING SYSTEMS, PART

ARRANGED ACCORDING TO THEIR FUNCTION

D. O. HAYNES, *Consulting Industrial Engineer*, DISTRIBUTI

6 Haulage Systems

6-A—Industrial Truck Mounting

6-A-1—Casters

- a—Canvas
- b—Metal
  - 1—Aluminum Alloy
  - 2—Steel
    - a—Semi Steel
      - 1—Plain Tread
      - 2—Grooved Tread
    - b—Pressed Steel
- c—Plastic
- d—Rubber Tired
  - 1—Semi-Pneumatic
  - 2—Solid
    - a—Metal Core
      - 1—Moulded-on
      - 2—Pressed-on
    - b—Steel Disc
      - 1—Moulded Tire
- e—Wood

6-A-2—Wheels

- a—Metal
  - 1—Aluminum Alloy
  - 2—Malleable Iron
    - a—Plain Tread
    - b—Grooved Tread
  - 3—Semi-Steel
    - a—Plain Tread
    - b—Grooved Tread
- b—Moulded Composition
  - 1—Hard Rubber
  - 2—Soft Rubber
- c—Rubber Tired
  - 1—Pneumatic
  - 2—Semi-Pneumatic
  - 3—Solid
    - a—Moulded-on
    - b—Pressed-on
- d—Spoke
  - 1—Steel
  - 2—Steel and Wood
  - 3—Wood

6-A-3—Tires

- a—Pneumatic
- b—Semi-Pneumatic
- c—Solid
  - 1—Moulded-on
  - 2—Pressed-on

6-A-4—Bearings

- a—Plain
- b—Self-Lubricating
- c—Ball
- d—Roller
  - 1—Straight
  - 2—Needle
  - 3—Tapered
- e—Combination Ball & Roller

6-B—Industrial Powered Truck Accessories

6-B-1—Sources of Power

- a—Fuels
  - 1—Diesel Oil
  - 2—Gasoline
- b—Storage Batteries
  - 1—Lead-Acid
  - 2—Nickle-Iron Alkaline
- c—Ready-Power Units
  - 1—Gas-Electric
  - 2—Diesel-Electric

6-B-2—Battery Charging

- a—Charges
  - 1—Motor Generators
  - 2—Rectifiers
    - a—Copper-Oxide
    - b—Selenium Oxide
- b—Battery Parts & Accessories
  - 1—Connectors
    - a—Cable
    - b—Cable Terminal
    - c—Cell
  - 2—Charging Plugs & Receptacles
  - 3—Charge Controls
  - 4—Cell Filler
  - 5—Hydrometer Syringes
  - 6—Voltage Testers

6-B-3—Miscellaneous Accessories

- a—Lubricants
- b—Lubricating Systems
- c—Exhaust Neutralizers
- d—Safety Fuel Cans

7 Elevating Systems

7-A—Elevating Accessories

- 1—Elevator Belting
- 2—Freight Elevator
  - a—Doors
  - b—Sills

7-B—Hoist Accessories

- 1—Blocks
- 2—Chain Wheels
- 3—Current Conductors & Collectors
- 4—Limit Switches
- 5—Variable Speed Controls
- 6—Air Compressor Systems
- 7—Load Carriers
  - a—Grabs
  - b—Hooks
  - c—Slings
    - 1—Chains
    - 2—Wire Rope
    - 3—Woven Wire
  - d—Tongs

8 Conveying Syste

8-A—Gravity Systems

8-A-1—Wheel Conveyors

- a—Parts
  - 1—Aluminum
  - 2—Steel
  - 3—Other
- b—Complete Sections
  - 1—Aluminum
  - 2—Steel
  - 3—Other
- c—Guard Rails
  - 1—Non-Adjustable
  - 2—Adjustable
- d—Supports
  - 1—Non-Adjustable
  - 2—Adjustable
  - 3—Stationary
  - 4—Castered
  - 5—Ceiling Hangars
  - 6—Wall Brackets
- e—Package Controls
  - 1—Flow Controls
  - 2—Stops
  - 3—Counters
    - a—Mechanical
    - b—Electrical
    - c—Electronic
- f—Ball Transfers
  - 1—Ball Assemblies
  - 2—Plates or Tables
  - 3—Shields

8-A-2—Roller Conveyors

- a—Rollers
  - 1—Aluminum
  - 2—Brass
  - 3—Magnesium
  - 4—Plastic
  - 5—Steel
  - 6—Wood
- b—Bearings
  - 1—Ball
    - a—Plain
    - b—Semi-Enclosed
    - c—Fully-Enclosed
- c—Sections
  - 1—Aluminum
  - 2—Magnesium
  - 3—Steel
- d—Guard Rails
  - 1—Non-Adjustable
  - 2—Adjustable
- e—Supports
  - 1—Non-Adjustable
  - 2—Adjustable
  - 3—Stationary
  - 4—Castered
  - 5—Ceiling Hangars
  - 6—Wall Brackets
- f—Package Controls
  - See 8-A-1e

8-B—

1-

a—Ca
b—Co
c—Im
d—He
e—Ru
f—Sta
g—Wo

2-

3-

4-

5-

6-

a—Co
b—Co
c—Sp
d—Va

7-

a—No
b—Ad

8-

a—No
b—Ad
c—St
d—Ca
e—Ce
f—Wa

9-

1-

*—*For detailed description and basic application of equipment listed here, see following pages. To locate information on a specific piece of equipment, find same in*

DLING SYSTEMS, PARTS & ACCESSORIES

CORDING TO THEIR FUNCTIONAL OPERATION *

AYNES, *Consulting Industrial Engineer,* **DISTRIBUTION AGE**

ing Systems

7-B—Hoist Accessories

1—Blocks
2—Chain Wheels
3—Current Conductors & Collectors
4—Limit Switches
5—Variable Speed Controls
6—Air Compressor Systems
7—Load Carriers
a—Grabs
b—Hooks
c—Slings
1—Chains
2—Wire Rope
3—Woven Wire
d—Tongs

8 Conveying Systems

8-A—Gravity Systems

8-A-1—Wheel Conveyors

a—Parts
1—Aluminum
2—Steel
3—Other
b—Complete Sections
1—Aluminum
2—Steel
3—Other
c—Guard Rails
1—Non-Adjustable
2—Adjustable
d—Supports
1—Non-Adjustable
2—Adjustable
3—Stationary
4—Castered
5—Ceiling Hangars
6—Wall Brackets
e—Package Controls
1—Flow Controls
2—Stops
3—Counters
a—Mechanical
b—Electrical
c—Electronic
f—Ball Transfers
1—Ball Assemblies
2—Plates or Tables
3—Shields

8-A-2—Roller Conveyors

a—Rollers
1—Aluminum
2—Brass
3—Magnesium
4—Plastic
5—Steel
6—Wood
b—Bearings
1—Ball
a—Plain
b—Semi-Enclosed
c—Fully-Enclosed
c—Sections
1—Aluminum
2—Magnesium
3—Steel
d—Guard Rails
1—Non-Adjustable
2—Adjustable
e—Supports
1—Non-Adjustable
2—Adjustable
3—Stationary
4—Castered
5—Ceiling Hangars
6—Wall Brackets
f—Package Controls
See 8-A-1e

8-B—Powered Conveyors

1—Belting
a—Canvas, Stitched
b—Cotton, Woven
c—Impregnated
d—Heat Resistant
e—Rubber Covered
f—Stainless Steel
g—Woven Wire
2—Cable
3—Chain
4—Magnet Pulleys
5—Rollers (End & Idler)
6—Power Elements
a—Complete Power Units
b—Control Boxes
c—Speed Reducers
d—Variable Speed Drives
7—Guard Rails
a—Non-Adjustable
b—Adjustable
8—Supports
a—Non-Adjustable
b—Adjustable
c—Stationary
d—Castered
e—Ceiling Hangars
f—Wall Brackets
9—Package Controls See 8-A-1e
10—Trolleys & Other Overhead System Parts See next columns

9 Transferring Systems

9-A—Monorail Systems

1—Monorail Track
2—Track Hangars
3—Current Distribution Systems
4—Controls
5—Trolleys
a—Manual
b—Powered
6—Trolley Wheels
7—Trolley Tractors

9-B—Crane Systems

9-B-1—Overhead Cranes

a—Brakes
1—Hydraulic
2—Mechanical
b—Bridges
1—Manual
2—Power
c—Controller
d—Interlocks
e—Load Carriers See 7-B-7

9-B-2—Power (Mobile) Cranes

a—Front-End Attachments
1—Bulk Materials
a—Clamshell
b—Dragline
c—Orange Peel
d—Magnet
2—Heavy Items
a—Hook Blocks
1—Single Sling
2—Bridle Sling
b—Hooks
1—Hair Pin
2—Special
3—Loose Stacked Material
a—Clamps
b—Grabs
c—Gapples
d—Tongs
4—Containers & Weights
a—Concrete Buckets
b—Skips
c—Tote Box
d—Skull Crackers

10 Self-Loading Systems

10-A—Fork Truck Parts and Accessories

10-A-1—Low-Lift Fork Trucks

a—Skid Platform Adapters

10-A-2—High-Lift Fork Trucks

a—Special Fork Types
b—Fork Extensions
c—Special Carriages and Attachments (See also 5-C-2a)
1—Extra High-Lift
2—Hydraulic Pushers
3—Revolving Forks
4—Scoops
5—Side-Shifting Forks
6—Snow Plow
7—Sweepers
d—Back Stops
e—Overhead Guards

10-B—Unit-Load Handling Accessories

1—Automatic Pallet Loaders
2—Unit Load Binders
3—Adhesives
4—Adhesive Applicators
5—Tape
6—Tape Dispensers
7—Steel Strapping
a—Flat
b—Round
8—Strapping Tools
a—Flat
b—Round
9—Skid & Pallet Storage Racks
10—Carton Shields

11 Handling & Building Accessories

11-A—Freight Handling

1—Bulkheads
2—Bulkhead Anchors
3—Car-Door Load Bracers
4—Car Liners
5—Car Prys
6—Car Pullers
7—Yard Switch Engines
8—Door Openers
9—Dock Boards

11-B—Motor Truck & Trailer Handling

1—Elevating End Gates
2—Tarpaulins
3—Wheel Chocks

11-C—Loading Platforms Handling

1—Bridge Plates (Ramps)
a—Manual
1—Aluminum
2—Magnesium
3—Steel
b—Powdered
2—Canopies
3—Cross-over Bridges

11-D—Building and Yards

1—Aisle (Floor) Markers
2—Bins
3—Fire Protection
a—Alarms
1—Automatic
2—Manual
b—Extinguishers
c—Extinguisher Systems
d—Hose
e—Smoke Detection Systems
f—Sprinklers
1—Automatic System
2—Supervisory Service
4—Floor Maintenance
a—Patches & Resurfacers
b—Scrubbers
c—Sweepers
d—Vacuum Cleaners
5—Sanitation
a—Fumigated
b—Insecticides
c—Rodenticides
d—Rodent Traps
6—Security
a—Burglar Alarms
b—Industrial Fencing
c—Watchman's Clocks
d—Watchmen's Service
7—Storage Protection
a—Covers
b—Pads
c—Shelving

llowing pages. To locate information on a specific piece of equipment, find same index number as shown opposite desired item in boxes above. Application Guide begins on Page 57. Basic Guide begins on Page 69.

1. HAULAGE SYSTEMS

1-A. FIXED ROUTES

1-A-1. Truck Dragging Systems

1-A-1-a. Overhead Trolley Type

Principal Products Handled

4-wheel platform trucks: Mixed (lcl) freight and uniform loads—cartons, boxes, crates, sheets (paper, leather, rubber), cylindrical shapes (carpets, pipe), barrels, drums—practically any materials which make up a stable load within the truck's size and load capacity. 2- and 3-wheel trucks: Specialized handling (barrels, etc.). Low-lift trucks: Unit and other loads on skids.

Typical Applications

Railroad and motor truck terminals, loading platforms, between and within plants, warehouses, stockrooms, etc., for relatively long runs, especially in accumulating, storing temporarily, distributing and order picking. Usually loaded and unloaded manually, but may be tied-in with other systems as, pallet-fork truck, skid platform, crane handling, etc.

Operational Comment

Although the path is fixed—straight, curved up to 180 degrees, inclined or declined—individual trucks can be attached, detached and moved about at will, thus making the method more flexible than some other fixed route systems. A single source of power is usually sufficient. No operator required to accompany a stable load in transit. Overhead supports are an inherent requirement.

1-A-1-b. In-Floor Type

Principal Products Handled

In general, the same kinds of materials as handled by Overhead Trolley Truck Drags.

Typical Applications

Although applications are generally the same as those for Overhead Trolley Truck Drags, this type has found wide application in single-story buildings.

Operational Comment

Essential difference between the two systems: In-Floor Type eliminates need for overhead supports, thus used where not practical to install hangars or where clear air rights are desirable.

1-A-2. Industrial Railroads

1-A-2. a-Locomotives b-Cars

Principal Products Handled

Locomotives: Haul cars and, with attachments, clear snow. Cars: Flat for general run of miscellaneous freight. Stake for pipe, reinforcing bars, structural shapes, logs, lumber, etc. Gondola, side- and bottom-dumping for loose, free-flowing materials (sand, gravel, coal, cinders, etc.). Crane for transferring.

Typical Applications

Type of locomotive depends upon service required, economic factors, location, etc. Industrial and process plants, refineries, ship terminals, lumber camps, mines, etc., generally for yard or out-of-door hauling of heavy loads over relatively long routes, between, in and through scattered buildings, power plants, outlying warehouses, etc.

Operational Comment

Based on sound principle of single, detachable power element to handle one or more carriers. Because path is fixed by track system, operational difficulties arise when units within the train are to be dispatched to different points and entire train may be held up while single unit is being unloaded. System not as flexible as more recently developed methods.

1-A-3. Winches (See 2-B-4)

1-B. VARIABLE ROUTES

1-B-1. Industrial Hand Trucks

1-B-1-a. Dollies

1-Furniture, 2-Lever, 3-Milk Case, 4-Pallet & Skid, 5-Paper Roll, 6-Roller

Principal Products Handled

Furniture, Milk Case, Pallet & Skid and Paper Roll designed for specific kinds of products, but also used for others, as Milk Case for filing cabinets or tote boxes, Paper Roll for any heavy cylindrical article carried on its side. Prys elevate slightly and provide temporary running gear for large boxes, crates, etc. Roller used to move heavy machines, motors, etc. Many other types available for special and specific purposes with every conceivable type of frame and running gear.

Typical Applications

Used in practically every kind of business—manufacturers, dairies, bottling plants, food processors, tanneries, etc. To move materials over short distances, as between operations, in and out of storerooms, on loading platforms, etc. Also extensively used by warehousemen, truckmen, deliverymen, etc. Pallet & Skid employed in freight car and truck loading and unloading operations and between machines in production lines. Roller types utilized by installation and maintenance crews.

Operational Comment

The small-size running gear—wheels, rollers or casters—of dollies limit their use to short runs and intermittent operations. Most types require relatively smooth running surfaces. Highly repetitive cycles of use cause undue fatigue.

1-B-1-b. Wheelbarrows

Principal Products Handled

Metal: Loose, free-flowing materials (sand, gravel, coal, cement, mixed concrete, cold and hot cinders, fertilizers, dirt, etc.). Wood: General utility use for boxes, bags, trash, etc.

Typical Applications

In plants, yards, power houses, utilities, maintenance departments for general purpose hauling over short distances.

Operational Comment

Not employed for highly repetitive hauling operations such as are usually carried on in industry and distribution.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

1-B-1-c. Two-Wheel Hand Trucks

1-Appliance, 2-Bag, 3-Baggage, 4-Barrel, 5-Cable Reel, 6-Cannery, 7-Carboy, 8-Caterpillar, 9-Chisel, 10-Combination, 11-Cotton, 12-Cylindrical Tank, 13-Lift, 14-Stevedore, 15-Tote Box, 16-Utility, 17-Warehouse

Principal Products Handled

There is no uniform basis for the names of two-wheel hand-trucks; some indicate the industry for which they were first designed (cannery), some the product handled (cotton), others, a functional feature (caterpillar). Nor are the names uniform among manufacturers or even sections of the country. Frequently the name is too limiting—cotton trucks handle any baled material, stevedore trucks are used by warehousemen and warehouse trucks by stevedores. Actually there is a two-wheel hand truck which can handle any kind of commodity within reasonable bulk and weight limitations.

Typical Applications

Practically every kind and size concern—manufacturers, utilities, warehouses, wholesalers, retailers, institutions, construction companies, railroads, motor and shipping lines are indicative of their wide use.

Operational Comment

Even though much handling has been taken over by mechanized equipment, the two-wheel hand truck still holds its own for many general and specialized handling operations.

1-B-1-d. Three-Wheel Hand Trucks

Principal Products Handled

More limited as to materials handled than two-wheel type because not offered in as great diversity.

Typical Applications

3-wheel type warehouse trucks used for general hauling and as a cart with overhead trolley drags.

Operational Comment

Although they relieve the operator of having to support the load during transportation, they are clumsier and take up more space than 2-wheel types when not in use.

1-B-1-e. Non-Lift Platform Hand Trucks

1-Baggage, 2-Box, 3-4-Wheel, 4-5th Wheel Steer, 5-6-Wheel

Principal Products Handled

Baggage: Exclusively for railway and express baggage. Wood, fibreboard and canvas-side Box Trucks: Light loose materials, bobbins, textiles, laundry, rubbish and, equipped with overhead racks, hung clothes. Metal Box Trucks: Heavier loose materials, meat, parts, poultry, wet laundry and textiles, castings, etc., and, equipped with shelves, tools, dies, trays, etc. 4-Wheel: In addition to a general utility truck of this type there are many special-purpose models for handling such items as soiled dishes, others fitted with racks to carry cylindrical items, as printers rollers, etc. 5th Wheel Steer and 6-Wheel for general utility but the latter especially in cold storage.

Typical Applications

Railway and express service, industrial plants, textile mills, packing plants, bakeries, food processors, warehouses, institutions, hospitals, restaurants, cafeterias, etc., for hauling over relatively longer distances than are practical with two-wheel hand trucks, or for commodities not adaptable to the latter.

Operational Comment

In many applications these trucks have been replaced by powered models to increase the speed of handling and reduce fatigue. They are still used, however, where distances are not too great and the handling cycle not too highly repetitive. Selection of the proper running gear for given conditions is important to secure required stability and ease of maneuvering.

1-B-2. Skid Platforms (See Sec. 5)

1-B-3. Powered Industrial Trucks

1-B-3. a-Wheelbarrow, b-3-Wheel, c-Powered Non-Lift Platform

Principal Products Handled

A wide variety of loads are carried on these trucks. The Non-Lift Platform type with drop frame is used largely for baggage, whereas the straight frame is used more generally.

Typical Applications

Throughout industry, warehousing and distribution where volume of handling, weights of loads, and distances are greater than can be economically transported by hand.

Operational Comment

The small, highly maneuverable 3-wheel truck is an excellent utility machine. The heavier true platform types are for more rugged service.

1-B-4. Trackless Trains

1-B-4-a. Industrial Tractors: 1-Light Duty, 2- 3-Point Contact, 3- 4-Point Contact

Principal Products Handled

For hauling various types of trailers (see below) also for pulling cars, snow plowing, etc. Light Duty, 3-Point Contact and 4-Point Contact are listed in the order of their ability to handle light, medium and heavy loads.

Typical Applications

Light Duty trucks almost exclusively for inside and platform work in industrial plants and warehouses. 3-Point Contact types at railroad terminals, large warehouses, and 4-Point Contact types for rugged service on wharves, yards, etc.

Operational Comment

Applies the principle of having a single, detachable power element to handle one or more burden carriers. Is, therefore, more flexible than systems restricted to a fixed route. Much of the success of any installation is dependent upon selecting the right type of trailer. It should be noted here that other types of powered equipment, such as high-lift fork trucks can also be utilized to haul trains of trailers.

1-B-4-b. Industrial Trailers: 1-Balanced, 2-Caster Steer, 3- 4-Wheel Steer, 4- 5th Wheel Steer

Principal Products Handled

In addition to being able to haul all kinds of articles carried by Overhead and In-Floor Trolley Drags, the medium and heavy duty tractors are capable of handling heavier individual loads under more severe operating conditions.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

Typical Applications

In plants, mills, warehouses and yards to carry the loads drawn by industrial tractors.

Operational Comment

Balanced type is highly maneuverable, but must be carefully coupled to trail well; can be pushed and pulled in either direction manually, but cannot be reversed as a train. Caster Steer pivots on the rear fixed wheels, is easily moved by hand, is difficult to steer backward but trails very accurately. 4-Wheel Steer trails excellently but is difficult to move about by hand. 5th Wheel Steer does not trail as accurately as caster or 4-Wheel Steer, is not reversible and is hard to turn by hand in confined spaces.

2. ELEVATING SYSTEMS

2-A. CONTINUOUS MOTION

2-A-1. Vertical Elevators

2-A-1-a. Vertical Arm Conveyors

Principal Products Handled

Flat Arms: Cartons, boxes, crates, pans, trays and similar articles. Curved Arms: Barrels, drums, kegs, milk cans, rolls of paper and cloth, ammunition (shells), bags, etc., all elevated on their bilges and sides.

Typical Applications

Plants, mills, warehouses, restaurants, hospitals, battleships, etc., usually for floor-to-floor movement.

Operational Comment

Highly efficient, especially when made automatic feed and discharge. Must be engineered to the particular job.

2-A-1-b. Vertical Bucket Conveyors

Principal Products Handled

Loose, free-flowing materials—grain, sand, coal, ashes, gravel, chemicals, and with small models, bolts, nuts and similar unbreakable items.

Typical Applications

Mills, mines, quarries and industrial plants, especially for feeding into hoppers or to other types of conveyors, both inside and outside of buildings and in open yard areas.

Operational Comment

Frequently tied in with other systems of handling. Can be designed to give horizontal and inclined as well as vertical motion. Usually self-feeding, they are, of course, automatic discharging. Highly efficient when engineered to the work to be done.

2-A-1-c. Vertical Push-Bar Conveyors

Principal Products Handled

Boxes, cartons, crates and similar articles which can be pushed vertically by a bar over slide or roller bed. A given conveyor of this type cannot handle mixed loads which vary widely in dimensions, especially as to their heights, since guards must be provided to keep articles from falling off.

Typical Applications

Canneries, food processors, bottling and similar plants for vertical travel, usually in combination with other types of handling equipment.

Operational Comment

Horizontal and inclined paths of travel can be provided, but declined paths are not used because articles being carried would slide forward against preceding push bar. Careful engineering required.

2-A-1-d. Vertical Suspended Carriage Conveyors

Principal Products Handled

Tote boxes, cartons, boxes, small articles, parts, tools, dies, samples, etc.

Typical Applications

Industrial plants, warehouses, paper converters, etc., usually between floors. Frequently used to send samples to or from a laboratory above a production department.

Operational Comment

Advantage is ability to carry loads in level position up, over the top and on the down side. Horizontal, inclined and declined as well as vertical paths. Frequently tied in as part of a complete system.

2-B. INTERMITTENT MOTION

2-B-1. Fixed Arm Cranes

2-B-1. Fixed Arm Cranes: a-Wall Cranes, b-Floor Cranes

Principal Products Handled

Both types support hoisting devices to handle work-in-process, dies, general freight.

Typical Applications

Machine shops, maintenance departments, shipping platforms, over hatchways or outside buildings. Mobile floor types where this feature is required.

Operational Comment

The simplest means available for supporting hoisting devices.

2-B-2. Fixed Arm Derricks

2-B-2. Fixed Boom Derricks: Pole, Rigid A-Frame, Tripod, etc.

Principal Products Handled

Miscellaneous kinds of hoisting devices with fixed booms to handle bags of sand, cement, flooring, light beams and structural materials.

Typical Applications

Extensively in the construction field, but also in warehouses and in shipping operations.

Operational Comment

Other types of derricks are more flexible—see Section 4. Transferring Systems.

2-B-3. Fixed Hoists

2-B-3-a. Manually Operated Fixed Hoists: 1-Block and Tackle, 2-Ratchet, 3-Differential, 4-Screw-Gear, 5-Spur-Gear

Principal Products Handled

Block and Tackle: With slings and other attachments handle boxes, crates, barrels, bags, sheets (metal, leather, etc.) practically any kind of product within the limits of the equipment. Ratchet: Machine parts and machines themselves, motors, shafting, etc., through short distances. Differential, Screw- and Spur-Gear types: With pendant attachments—hooks, grabs, trays, etc., can handle practically any kind of material. See Section 7B—Hoist Attachments.

Typical Applications

Block and Tackle: Warehouses, frequently for external lifting to upper floors, ships, plants, construction work, etc. Ratchet: Machine shops, maintenance, installation and repair crews to elevate and hold work. Differential, Screw- and Spur-Gear types: Industrial plants, utilities, refineries, chemical plants, power houses and others, usually in connection with overhead transferring systems.

Operational Comment

Block and Tackle is the least expensive but also the least efficient type of hoist. Ratchet is an extremely useful one-man tool. Gear types, in the order given, are increasingly efficient and, consequently, more costly in price.

2-B-3-b. Air-Operated Fixed Hoists: 1-Air Cylinder, 2-Air Motor

Principal Products Handled

Both types: With grabs, hooks and other attachments handle a wide variety of materials—individual items and other pieces of handling equipment.

Typical Applications

In foundries, plating plants and widely in situations where there are hazardous fumes, as in chemical plants.

Operational Comment

Both types have very sensitive speed control, but their range is limited by the length of air-hose required. Relatively more costly to operate than electric hoists, but their non-sparking feature makes them a must in many situations. Air-cylinder type requires more head room in which to operate than air-motor diesels.

2-B-4. Winches

2-B-4. Winches: a-Manually Operated, b-Electric, c-Fuel or Steam

Principal Products Handled

The power elements in hoisting systems, but occasionally used as direct means of moving, as special types, for example, car pullers and capstans.

Typical Applications

Used for such operations as opening heavy furnace doors, loading and unloading ships on crane barges, in the construction field for elevating materials, in lumbering and similar heavy-duty activities.

Operational Comment

Hold a unique position in the kinds of work indicated.

2-B-5. Stackers (Various Types)

Principal Products Handled

Skids, pallets, boxes, crates, barrels, drums, bags, rolls of paper, cloth, etc.

Typical Applications

In industry and warehousing for stacking away items, either with or without supporting shelves and in maintenance work (replacing light bulbs, repairing overhead pipes, shafting, etc.) to elevate men and materials.

Operational Comment

Extensively used for stacking in order to elevate loads so articles may be handled more readily, but where unit loads are used, self-propelled machines are now more generally employed—see Section V. Self-Loading Systems.

2-B-6. Levelers

2-B-6. Levelers: a-Floor, b-Work

Principal Products Handled

Floor: Materials usually, but not necessarily, on trucks of one kind or another. Work: Parts, sheet metal, pipe, etc., to work level.

Typical Applications

Floor: To compensate for relatively slight differences in floor levels so as to avoid use of ramps, on loading docks to bring materials to and from truck-bed level and, as in garages, to elevate machines for servicing. Work: In production departments, machine shops, press departments and assembly lines.

Operational Comment

Floor types are not intended to serve as between-floor freight elevators (see Section 2-B-7-c-1 Freight Elevators). Work: Some models designed with automatic means of keeping work level as units are added to or removed from the leveler.

2-B-7. Elevators

2-B-7-a. Dumbwaiters

Principal Products Handled

Light materials and articles—tote pans, trays, samples, tools, dies, papers, etc.

Typical Applications

In plants between departments on different floors, offices, laboratories, institutions, restaurants, cafeterias, etc.

Operational Comment

Inexpensive means of handling light articles intermittently. Low initial and practically no maintenance cost. No power required

2-B-7-b. Skip Hoists

Principal Products Handled

Coal, ores, limestone, gravel and similar lump materials, as well as goods in cartons and bales.

Typical Applications

Mines, quarries, steel mills (to feed blast furnace charges) and similar locations to elevate loose materials in bulk. Also in industrial plants for elevating packaged goods.

Operational Comment

Can be designed to discharge on either the same or opposite side as received.

2-B-7-c. Freight Elevators: 1-Hydraulic, 2-Electric

Principal Products Handled

Hydraulic usually for automobiles, and industrial trucks

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

in relatively low buildings. Electric: Inside and on the outside of all types of buildings to handle general freight, industrial trucks and other transporting equipment. Sometimes with monorails for carcass or cured meats, garments on hangers, etc.

Typical Applications

Hydraulic in garages and buildings with limited number of stories. Electric: Universally for freight handling.

Operational Comment

Hydraulic are relatively slower than electric, but are very smooth-running. Since the wide acceptance of unit-load handling by so many different types of concerns, the manufacturers of freight elevators have brought out models especially designed to meet the kind of shock loads involved in moving heavy mechanized equipment on and off elevators in multi-story buildings.

3. CONVEYING SYSTEMS

3-A. GRAVITY SYSTEMS

3-A-1. Sliding Friction Conveyors

3-A-1-a. Skids

Principal Products Handled

Skid Boards: Cartons, boxes, cases, bags, baskets, hampers loose-flowing materials (sand, gravel, coal) provided they will not be injured by sliding. Barrel Skids: Barrels and drums.

Typical Applications

Throughout industry generally, in warehouses, utilities, etc. Frequently carried on trucks by delivery men. Used for temporary operations.

Operational Comment

Limited in their length and are not good for handling fragile items, those that are top-heavy, cubical or round nor for short cylindrically-shaped pieces because of rapid acceleration.

3-A-1-b-1. Plain Chutes

Principal Products Handled

Same general types of materials as handled by skids, even barrels, provided proper troughing is arranged.

Typical Applications

Straight and curved chutes installed in manufacturing, bottling, food processing, warehouses, etc., for floor-to-floor (seldom longer) operation; short sections for guiding products from punch presses, etc.; in assembly lines, packaging and shipping departments, etc. Frequently tied-in with other conveyors and systems.

Operational Comment

All the limitations of skids, although curved sections have some retarding effect.

3-A-1-b-2. Flexible Chutes

Principal Products Handled

Loose-flowing materials, grain, flour, seeds, etc., and also bagged goods.

Typical Applications

Ship and railway terminals for loading and unloading, and in industry for directing flow of materials to and from storage hoppers, etc.

Operational Comment

Ability to control flow of materials selectively to various discharge points is a decided advantage of this type of chute.

3-A-1-b-3. Spiral Chutes

Principal Products Handled

Many kinds of materials which cannot be lowered by plain chutes are handled by spiral types—more fragile items, barrels and drums on their ends, and less stable objects due to lower pitch and more gentle descent.

Typical Applications

Widely used in multi-story manufacturing plants, warehouses of all types, distributors (wholesalers and jobbers), meat packers, textile mills, mail order houses, etc.

Operational Comment

Advantages over plain chutes are better control of speed, lower pitch, floor space conservation. No power is required and maintenance cost is very low. Can receive and discharge at various floors and multiple-blade types permit initial selectivity. Frequently used in connection with other systems of handling. Although able to handle greater variety of goods than plain chutes, spirals are not recommended for handling in the same line with a mixture of heavy and light items where the former might damage the latter, nor with mixtures of wet and dry cartons and cases. Sometimes utilized for temporary storage on line, provided too great pitch is not required to permit self-starting of the line. Must be engineered to the given conditions.

3-A-2. Rolling Friction Gravity Conveyors

3-A-2-a. Gravity Wheel

Principal Products Handled

Packaged goods with one firm, smooth side and crates, etc., with cleats or articles with projection which will ride between the wheels; articles carried on flat paperboard, wood veneer or sheet metal pallets (not to be confused with the pallet of the unit-load system); smooth cylindrical items carried lengthwise on their sides (ammunition shells, etc) and bags, provided wheels are very closely spaced and sufficient pitch is possible. Bolt-supported wheel types also handle carriers with runners which fit in groove-faced wheels.

Typical Applications

Perhaps the most widely used type of gravity conveyors—in industrial plants for conveying in practically every activity—production, assembly lines, receiving, packing, shipping, storage, etc.; in public and private warehouses and dstributors of all types; wholesalers, jobbers, retailers, mail order houses, etc. Many truckmen carry short lengths as aids in unloading and delivering. Sometimes, especially in chain store storage spaces and distribution warehouses, the line is set level and the articles pushed about to and from storage points. If lines are long and free-flow is utilized it is usually necessary to restore elevation by a booster. Frequently tied-in with other handling systems.

Operational Comment

In skate-wheel type six wheels must at all times be under smallest package carried. These axle-supported wheels are used for less heavy duty than wheels which are bolt mounted. Different types of wheels are available —rubber, micarta, grooved, etc., to meet given conditions.

3-A-2-b. Gravity Roller

Principal Products Handled

Articles must have one smooth, flat, firm surface or cleats running lengthwise. Products handled generally heavier than with wheel type. Also cylindrical articles which are stable when carried on their ends—barrels, cans, drums, etc., ingots, billets, etc.

Typical Applications

Same general applications as wheel type where nature of commodities or more severe service require this type. Specific application in refineries, oil processing plants, etc., where drums are used in quantities. Frequently part of a system, as in feeding from assembly operations to belt conveyors, as the declined part of belt systems and relatively short units for feeding or taking away work at machines, in the beds or over-the-road trucks to assist in handling cinder blocks, etc.

Operational Comment

At all times, three rollers must be under the smallest article to be handled. Unless the wheels are set very close, the roller type of conveyor is more expensive than a similar wheel type, but is sturdier and capable of handling heavier, more diversified loads.

3-A-2-c. Gravity Flexible

Principal Products Handled

Accordion Type: Equipped with rollers they handle the same general kinds of materials as regular roller conveyors, but sizes are more restricted because spacing of rolling elements as conveyor is extended by curving. Telescopic Type: The same kinds of materials as regular models because these wheel and roller conveyors extend in a straight line.

Typical Applications

Both types used as temporary extensions to conveyor lines, on platforms, in freight cars and motor carriers, for shifting flow in production lines, etc.

Operational Comment

Accordion models usually used where curved paths are required, while the Telescopic type is restricted to straight-line flow, however, the latter have the advantage of uniform roller or wheel spacing.

3-A-2-d. Gravity Roller Spiral

Principal Products Handled

Articles which might be damaged by rubbing on the slide bed of a spiral gravity chute or where lower pitch is helpful in handling drums on their ends or articles which would be top heavy on the greater pitch of a slide bed.

Typical Applications

Not as widely used as plain spiral chutes, but in some instances are a must to make the use of a spiral conveyor possible. Where accumulation on the line is desired, rollers are frequently used because the articles will start to move more readily under their own weight than on a plain spiral chute.

Operational Comment

Most chutes of this type are equipped with rollers, but wheels may be used where applicable. Must be expertly engineered to a given situation.

3-B. POWERED SYSTEMS

3-B-1. Belt Conveyors

3-B-1-a. Slide-Bed Belt Conveyors

Principal Products Handled

A great variety of light- and medium-weight products, especially packaged goods, as cartons, boxes, and bags. By selecting the right belt from a wide range, such items as bottles, cans and cases; wet, cold and high temperature products may also be handled.

Typical Applications

Almost all types of businesses utilize belt conveyors—manufacturers, air, railway and ship terminals, warehouses, distributors, wholesalers of all kinds, retail, chain and similar establishments, utilities and institutions. Used in production, assembly, packing and shipping departments, for floor-to-floor boosting, to restore elevation in gravity lines and in such diverse types of plants as canneries, drug, pharmaceutical and cosmetic, dairies, ice cream plants (even in hardening rooms), bakeries and food processors. Table models are widely used in light manufacturing and assembly activities.

Operational Comment

Horizontal, inclined and declined paths in straight lines only. Frequently part of a system of conveying to vary direction of flow with other types of equipment. Floor or ceiling supported relatively less expensive than roller-bed types, but not capable of handling as heavy articles nor in as long lines because of friction between belt and bed. However, the slide bed is quieter and the products ride more smoothly than on a roller-bed conveyor. Types of belt include those for specific purposes—sanitary for food products, rough-top and cleated to permit increased pitches, treated belts to withstand high and low temperatures, wire and wire mesh for wet products, bottles and cans, steel bands for hot materials—and so on in great variety.

3-B-1-b. Roller-Bed Belt Conveyors

Principal Products Handled

Same general kinds of commodities as slide-bed conveyors, but usually for heavier products or where greater lengths of travel are involved, but with certain restrictions because of more limited range of belt selection.

Typical Applications

Widely used throughout industry and distribution, but less extended than slide-bed types.

Operational Comment

Although lower power requirements and possibility of using longer lines is an inherent characteristic of roller-bed conveyors, many of the special kinds of belts which can be used over slide beds cannot be employed over rollers—such, for example, as wire mesh and under low-temperature conditions the bearings of roller types are apt to give trouble.

3-B-1-c. Live-Roller Belt Conveyors

Principal Products Handled

The same general kinds of articles as handled by gravity roller conveyors—those with one firm, smooth surface. Widely used to handle packaged goods in boxes, cartons and crates, but also smooth cylindrical objects such as pipe.

Typical Applications

Used basically the same as roller gravity, with the additional advantage of being powered, so that slight inclines are possible.

Operational Comment

An outstanding advantage is the feature that the operator can stop packages or other objects on the line without having to shut off the power.

3-B-1-d. Trough Belt Conveyors

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

Principal Products Handled

Heavy duty types used for handling bulk, loose, materials, as grains, ores and coal which are not sticky. Lighter types for small parts, bags, etc.

Typical Applications

Mining for long distance conveying, but also in industry for small, individual items.

Operational Comment

The trough feature keeps the materials or articles centered on the conveyor. Both roller- and slide-bed models are available—the former being used for heavy duty service.

3-B-2. Powered Cable Conveyors

3-B-2-a. Powered Cable Drags

Principal Products Handled

Bulk, loose materials which are not sticky, as coal, crushed stone, ores, cord wood and logs. Also more finely divided materials such as sawdust.

Typical Applications

Extensively used in mining, logging and lumber mill operations.

Operational Comment

A very flexible type of conveyor which can easily be extended or contracted as operations require. Not suitable for materials which will be damaged by dragging over the trough bed.

3-B-2-b. Powered Overhead Cable Trolley

Principal Products Handled

Wide variety of materials carried by floor truck (carts), hooks, grabs, suspended trays, etc.

Typical Applications

In addition to use as truck drags, these conveyors employed in production, assembling, packing and shipping departments and especially to carry articles through processing, as heat treating, spraying, etc.

Operational Comment

See also under 1-A-1. Truck Dragging Systems. These conveyors are used for lighter duty than 3-B-3-h-1. Powered Overhead Chain Trolley Conveyors (which see).

3-B-3. Powered Chain Conveyors

3-B-3-a. Apron Chain

Principal Products Handled

Solid Aprons: Finely divided and bulky materials, especially if abrasive or high temperature. Perforated Pans: Wet and high-temperature articles, food products, metal parts, scrap, etc.

Typical Applications

Metal manufacturing, foundries for parts quenching, for handling wet food products, etc.

Operational Comment

Most frequent use is for handling products which would damage a belt conveyor or where wet materials require a carrier which permits them to drain.

3-B-3-b-1. Package Drag Chain

Principal Products Handled

Cartons, cases, boxes, milk and ice cream cans, pans, etc. Another type of conveyors of this class, equipped with smooth, flat-top chains handle a wide variety of containers—glassware, including bottles, vials, jars and jugs, cans, pails, etc.—as well as any other small products such as milk cartons, machine parts, castings, wooden articles, etc.

Typical Applications

The case and can conveyors widely used in dairies, ice cream plants, distilleries and other kinds of bottling plants, and in bakeries where they are utilized to transport hot pans. The flat-top variety is used universally in the packaging field, being an essential element in a filling line of any considerable size. Found in pharmaceutical, cosmetic, drug, paint, food processing, canning, beverage, dairies, and many other similar kinds of plants. Also, in metal- and wood-working plants to carry such items as metal bars, castings and strips of wood of finished articles, as in furniture manufacturing.

Operational Comment

Both types are rugged and extremely flexible. They provide a smooth, even ride over straight or curved horizontal paths. Slight inclines or declines can be provided which are increased by the use of lugs.

3-B-3-b-2. Bulk Materials Drag Chain

Principal Products Handled

Loose, bulky materials, as coal, cement, ashes and sawdust, as well as chunky articles such as logs.

Typical Applications

Mining, cement mills, quarries, logging camps and lumber mills, etc.

Operational Comment

The simplest of drag chain conveyors. Cannot handle sticky materials—only those which are free-flowing.

3-B-3-c. Flight Chain: 1-Push, 2-Roller

Principal Products Handled

Push: Finely divided or lumpy materials. Small models for elevating individual articles, as boxes, bottles and cans which are not damaged by sliding over the bed. Roller: Packaged goods, especially those which would be damaged by push flights.

Typical Applications

Push: In mines, retail yards and power plants to handle coal. Small models built on the flight principle utilized in such establishments as chain grocery stores to elevate individual articles from basement storage to upper store floors. Roller: Pharmaceutical, food processing and bottling plants in packaging lines and in industry for assembly-line work.

Operational Comment

Push: Permits greater-than-usual pitches in elevating loose materials. Roller: Particularly where it is necessary to stop packages on the line without having to shut off the power driving the conveyor, in which case the rollers continue to advance but do not cause sliding friction on the bottom of the packages or articles being conveyed. Hence their wide use in progressive assembling as well as in packaging.

3-B-3-d. Live-Roller Chain

Principal Products Handled

Same general kinds of materials as live-roller belt conveyors—see Section 3-B-1-c, Live-Roller Belt Conveyors, but primarily to convey articles which would damage a

driving belt, as high-temperature or abrasive materials—hot castings, sheets or bars, etc.

Typical Applications

In industry generally but especially where heavy duty is required as in foundries, steel mills, refineries, printing plants, etc.

Operational Comment

No pitch is required—the powered rollers provide motion. The drive is positive without any chance of slippage. Heavy construction makes their use for barrels and drums especially important.

3-B-3-e. Pallet Chain

Principal Products Handled

Wide variety of uniform or mixed loads on flat-surfaced load carriers called pallets, which may be small dollies or other kind of wheel-equipped devices.

Typical Applications

In industry, especially in assembling operations and in freight terminals for accumulating and distributing package freight. Also in bottling plants, and steel mills and in foundries for handling moulds, flasks and castings.

Operational Comment

Fixed, horizontal and slightly inclined or declined routes, frequently in a closed path.

3-B-3-f. Slat Chain

Principal Products Handled

Heavy uniform or non-uniform loads—individual cartons, boxes, crates, barrels, drums, bags, etc. Also semi-finished or finished articles, as furniture.

Typical Applications

Industrial plants, furniture, automobile, household appliances, etc., and in oil refineries and steel mills.

Operational Comment

Slats may be of wood or metal and the conveyor is ruggedly constructed for heavy duty service and to withstand shock loads. Straight horizontal or slight inclines and declines are possible, which can be greater if cleats are provided.

3-B-3-g. Stabilized Tray Chain

Principal Products Handled

Bakery products and articles to be heat-treated, sprayed, dried, etc.

Typical Applications

In bakeries and industrial plants for processing operations.

Operational Comment

Make maximum use of floor space because of inherent type of construction which involves a path of travel back and forth over the same area.

3-B-3-h. Vertical Type Chain Conveyors

See Section 2. Elevating Systems

3-B-3-i. Trolley Chain Conveyors: 1-Overhead Type, 2-In-Floor Type

Principal Products Handled

In addition to their use as truck drags (see Section 1-A-1. Truck Dragging Systems) the Overhead type, with various pendant attachments, is utilized, as are the Trolley Cable Conveyors (3-B-2-b. Trolley Cable Conveyors) to handle many types of articles by means of trays, grabs, hooks, etc. The In-Floor type is utilized to assist various kinds of equipment up ramps and to transport machines, etc., through manufacturing operations, especially assembly lines, as in the automotive industry.

Typical Applications

Both are used widely throughout industry for the type of conveying indicated.

Operational Comment

In general, the chain type of trolley conveyor is used for heavier-duty jobs than the cable equipment.

3-B-4. Powered Portable Conveyors

Same uses as stationary models with advantage of portability.

3-B-5. Pneumatic Conveyors

3-B-5-a. Pneumatic Conveyors: Pressure and Suction Types

Principal Products Handled

Loose materials as grain, flour, cotton, nuts, seeds, powdered coal, etc. Types with carriers handle small articles: Cash, samples, tools, papers, mail, orders, requisitions, instructions, blueprints, etc.

Typical Applications

Freight terminals, mills, etc., distribute materials to and from storage. Pneumatic conveyors also are used in freight car and ship loading and unloading operations. The carrier types are widely used in offices, industrial plants, warehouses, wholesale and retail establishments, institutions, mail order houses, air and freight terminals, railway stations, post offices, etc. Large cities use an underground system of pneumatic tubes to dispatch mail from one post office substation to another and to central stations for final distribution to railways and air lines.

Operational Comment

Pressure systems are used for relatively longer lines and where distribution is from a central point to a variety of outlets. Shorter lines, where distribution is from several points to a central collecting location, use the suction system.

3-B-6. Screw Conveyors

3-B-6. Screw Conveyors: Single and Double Types

Principal Products Handled

Single Types: Bulky, loose, free-flowing and also sticky materials as coal, asphalt, cement, soda ash, sugar, grain, lime, molasses, tar, powdered clay, etc. Double Screw for individual articles as bags.

Typical Applications

Single in food, chemical and other industrial plants where products of this type are moved in sufficient volume to warrant. Also in mining and quarrying. Double type largely for moving bags to and from railway cars, storage piles, etc.

Operational Comment

Single type is usually laid in horizontal line, but slight inclines are possible. The Double type acts by advancing articles along two oppositely turning screws.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

4. TRANSFERRING SYSTEMS

4-A. FIXED ROUTES

4-A-1. Monorails

4-A-1. Monorails: a-Manually Propelled, b-Power Propelled

Principal Products Handled

Manual: With "under the hook" attachments—trays, baskets, grabs, etc., light—and medium light objects and loads—carcass meat, articles passed through processing in spray booth, quick freezing tunnels, etc. Without special attachments, garments on their own hangers. Powered: Heavier loads and longer runs than are feasible with manually propelled types.

Typical Applications

Manual: On loading docks, in elevators, in over-the-road trucks and in storage areas by meat packers, warehousemen and chain store distributing depots for their meats. Also in other industries especially in dry cleaning establishments, retail department stores, etc., to handle men's and women's wear. Powered: In industry and warehousing to handle heavy loads.

Operational Comment

Although routes are fixed, switches, turntables, etc., make this system of handling very flexible. Note that each trolley operates independently so that monorails are utilized for more spotty operations when cable or chain overhead trolley drags.

4-B. LIMITED AREAS

4-B-1. Derricks

4-B-1: Derricks: a-Stiff-Leg, b-Guy Line, c-Miscellaneous

Principal Products Handled

All derricks serve as means of supporting hoisting devices to elevate a wide variety of materials, depending upon the attachments used to hold or support them.

Typical Applications

All types are used extensively in the construction and marine fields and may be erected on the ground, on elevated structures, or on barges and automotive equipment. Latter extensively used to handle pipe, lumber, etc., in and out of railroad cars, in storage yards and for emergency road repairs to equipment. Their field is largely for heavy duty, outdoor work.

Operational Comment

The type chosen for a particular operation depends particularly on the degree of swing required. (See Master Chart for details.)

4-B-2. Cranes

4-B-2-a. Jib Cranes: 1-Wall Bracket, 2-Column, 3-Pillar, 4-Portable

Principal Products Handled

All types of jib cranes are utilized to support various kinds of hoisting devices.

Typical Applications

Wall Bracket: Widely used in machine shop, maintenance and repair departments to transfer machines and parts from one location to another over very limited areas. Column: For same general service but where it is not practical to attach the crane to a wall and where full swing is required. Pillar: Where structural columns are not available in order to provide full swing—generally for yard or other outside service. Portable: Also in machine shops, etc., where mobility is important.

Operational Comment

Note that the portable type is not intended to be used in moving loads from point to point. Machines of this type may be pushed to the location where they are to be used, which is frequently advantageous.

4-B-2-b. Bridae Cranes: 1-Overhead Traveling, 2-Gantry

Principal Products Handled

Both types support lifting devices—usually electric hoists. Type of crane determined by service required.

Typical Applications

Overhead Travelling: Heavy industries, especially steel mills and their open storage areas, ship yards, pipe storage yards, etc. Gantry: Freight yards, shipping wharves, on the outside of long buildings, etc., frequently in connection with rail receiving and delivering, as in loading and unloading heavy materials, pipe, scrap, etc., with grabs. magnets, etc.

Operational Comment

Trackage system required for both types. (See Master Chart for details of construction.)

4-B-2-C. Portal Cranes

Principal Products Handled

Primarily and almost exclusively for handling ship's cargo.

Typical Applications

Used at shipside on wharves where heavy cargo is handled.

Operational Comment

Are equipped with full-revolving boom-type crane.

4-B-2-d. Power Cranes: 1-Automotive, 2-Locomotive

Principal Products Handled

Both handle relatively heavy loads by means of various attachments.

Typical Applications

Automotive type for general yard service for handling pipe, structural shapes, etc., generally in open areas. Locomotive type restricted to fixed route of trackage, but used in railroad yards and on rail spurs. Widely employed by railroads in repair work, for hoisting and removing wreckage, etc.

Operational Comment

Neither type is utilized to any extent to transport suspended loads. They are both restricted to one-the-job work of hoisting and transferring within the limits of their swing.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

5. SELF-LOADING SYSTEMS

5-A. SKID SYSTEMS

5-A-1. Skids

5-A-1. Skids: a-Live, b-Semi-Live, c-Dead

Principal Products Handled

All types capable of handling true unit loads. Strapped or glued, cartons, crates, etc., flat sheets of paper stock, but also individual items as barrels, drums, etc. If equipped with stakes, side members, etc., can support articles which otherwise could not be handled in quantities, as short lengths of lumber and pipe, hides and skins, rolled carpets and other textiles, etc.

Typical Applications

Live Skids: Where mobility is desirable to maneuver loads on their own carrier without use of additional equipment. Cannot be multi-stacked, even on shelves because of live running gear. Relatively expensive as means of storage for long holding. Are utilized in industry and warehousing for short movement of loads which are later to be handled by powered self-loading equipment. Semi-Live: With either manual or powered skid jacks (see below) by manufacturers to move materials between operations, into and out of storage areas and by warehousemen where multiple tiering is not practical. Frequently used for temporary storage of materials which turn over rapidly as in wholesale produce houses. Dead: Where mobility of individual skids is not required. Frequently used to carry unit loads in transit, as in the paper industry for skid-loads of flat stock, also in warehousing where multiple tiering, for one reason or another (height of storage facility or nature of products handled) is not feasible.

Operational Comment

All types are the basis of the skid-platform method of handling, which was the first true self-loading system permitting the use of unit loads. In general, the larger wheels utilized with this system make the equipment easier to handle manually and enables the machines to run over rougher floors, etc., than pallet handling device.

5-A-2. Skid Jacks: a-Hand, b-Powered

Principal Products Handled

Both types used as means of elevating and transporting semi-live skids by providing running gear at the dead end of the carrier.

Typical Applications

Where semi-live skids are utilized. See above.

Operational Comment

The powered types are sometimes utilized for towing jobs other than for skids. Skids handled by both types are difficult to maneuver in reverse.

5-A-3. Low-Lift Platform Trucks

5-A-3-a. Low-Lift Skid Platform Hand Trucks: 1-Mechanical Lift, 2-Hydraulic Lift

Principal Products Handled

Both types for raising slightly and transporting skids. Choice depends largely on degree of activity, weights and distances involved rather than specific types of loads.

Typical Applications

Extensively used throughout industry to move materials from one production unit to another, into and out of storage areas; in warehousing on loading platforms, in and out of trucks, on and off elevators, in storage facilities and by distributors of all types in their handling operations, assembling and distributing materials, etc.

Operational Comment

Both are utilized for relatively short runs, the mechanical type for lighter and the hydraulic for medium-weight loads.

5-A-3-b. Powered Low-Lift Skid Platform Hand Trucks: 1-Non-Ride, 2 Ride

Principal Products Handled

Used for transporting skids with heavier loads and over greater distances than with manually propelled machines.

Typical Applications

Extensively in the same general locations as the hand models, but specifically where loads are fairly heavy and the distances longer. Are also used in outside storage areas, provided the running surfaces are sufficiently smooth.

Operational Comment

Evolved from the skid hand lift truck, these so-called walkies now are made in both non-ride and ride models, the latter being a development which has greatly extended their range and usefulness.

5-A-3-c. Powered Low-Lift Skid Platform Trucks

Principal Products Handled

Compared with powered hand trucks (see above), these machines are more sturdily built and can, therefore, be used for heavier service over greater distances. Used to handle castings, structural shapes, machines, motors, etc., on skids.

Typical Applications

Primarily in heavy industries for transporting individual items on skids.

Operational Comment

The original type of low-lift skid platform, later replaced for lighter duty by the hand group of machines. Larger, more powerful batteries are used and considerable space in aisles and work areas is required for this type of truck.

5-A-4. High-Lift Platform Trucks

5-A-4-1-a. High-Lift Platform Hand Stackers

Principal Products Handled

Unit loads and miscellaneous articles on skids.

Typical Applications

Used primarily for elevating skids either for multiple tiering, where nature of product is such that it will support the skid runners (paper flat stock) or for storage on shelves or racks.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

Operational Comment

Limited as to mobility because not self-propelled and as to loads because manually operated, unless equipped with electric drives for elevating.

5-A-4-1-b. Powered High-Lift Platform Stackers: 1-Non-Ride, 2-Ride

Principal Products Handled

Primarily for unit loads or individual articles on skids.

Typical Applications

For elevating and tiering where conditions permit (see above) and where self-propelled machines are an advantage, particularly in warehousing and storing operations.

Operational Comment

These walkies were developed after the low-lift types and have greatly extended the use of mechanical equipment for skid operations. There are now ride as well as non-ride models which further extend their usefulness.

5-A-4-1-c. Powered High Lift Platform Trucks

Principal Products Handled

For heavier duty service than the stacker-type skid elevating machines.

Typical Applications

Used in industry, especially where heavy loads are involved, as to elevate charges for furnaces, etc. Also for handling castings, either loose, when large, or, in boxes, when small.

5-B. PALLET SYSTEMS

5-B-1. Pallets

5-B-1. Pallets: Various Types

Principal Products Handled

Support unit loads and miscellaneous articles as cases, boxes, barrels, drums and bags, which are accumulated to be handled as a unit, or individual articles, as motors, valves, etc. Box, stake, frame and similar superstructures make it possible to handle loose items as clothing, mattresses, brooms, tires, boxed shoes, etc.

Typical Applications

Now almost universally used for handling unit loads in manufacturing, distribution, warehousing for all types of packaged goods and articles in production areas, packing and shipping departments, etc. Also for ship's cargoes, handling freight at terminals, both rail and airline, etc.

Operational Comment

Single-Faced: Where tiering is not done, or with products which can support runners. Double-Faced: The usual type for tiered loads. Reversible: Where full bearing surface is required and where low-lift pallet trucks are used. Non-Reversible: Essential where low-lift equipment is used to handle double-faced pallets. Flush Stringers: For majority of handling operations. Full-Wing: Where slings are used and full bearing surface is desired as in stevedore pallets. Semi-Wing: Also with slings, but primarily with some high-lift stacker type pallet trucks to admit the outriggers under the pallet. Two-Way: For most pallet-handling operations. Four-Way: Where essential that entry be possible from any side of the pallet. Eight-Way: For practically any angle of entry. Bin or Box: For loose materials and items which, of themselves, do not make stable loads. Stake: For long items, pipe and lumber. Picture Frame: For items which are not sufficiently strong to be self-supporting—with slack filled boxes as with confectionery, shoes, etc. Expendible: For temporary jobs, especially as one-way shippers. Metal: Where unusual strength is required, or rugged service, especially for hot or high temperature materials. There is a pallet available to carry practically any kind of material or article.

5-B-2. Low-Lift Fork Trucks

5-B-2. Low-Lift Fork Trucks: a-Hand, b-Powered Hand: 1-Non-Ride, 2-Ride

Principal Products Handled

Loads of any kind, generally unitized, on pallets which are either single-faced or reversible double-faced.

Typical Applications

To elevate slightly and transport loads on pallets through industrial plants between operations and along loading docks and in storage spaces. Also in terminals, warehouses, wholesale houses of all types, food processing, textile mills, paper mills, publishers, printers, dairies, ice-cream plants—any location where palletized loads are handled.

Operational Comment

The hand types are for loads up to 1500 lb and distances of about 100 ft. The powered types, referred to as walkies, even though there are now ride types, for heavier loads and longer distances.

5-B-3. High-Lift Fork Trucks

5-B-3-a. High-Lift Fork Hand Stackers

Principal Products Handled

For relatively light loads and where distances are not great.

Typical Applications

Rather limited in application to tiering pallets in restricted storage areas.

Operational Comment

Self-propelled models have largely replaced the hand-propelled type of truck. Must operate within the limits imposed by the wire connecting it with line current.

5-B-3-b. Powered High-Lift Non-Counterbalanced Fork Hand Trucks: 1-Non-Ride, 2-Ride.

Principal Products Handled

Unit loads of all types on pallets.

Typical Applications

Widely used in warehouses and industry generally to transport and elevate unit loads where maneuvering space is at a premium. Light weight permits riding on most elevators with the load. Also used to elevate loads to beds of trucks where loading platforms are not available, as in metropolitan ground-floor stores.

Operational Comment

Hold a predominating position in fields where aisles must be narrow to conserve space.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

5-B-3-c. Powered High-Lift Counterbalanced Fork Hand Trucks: 1-Non-Ride, 2-Ride

Principal Products Handled

Unit loads of all kinds on pallets.

Typical Applications

Where a counterbalanced hand-type stacker is required, especially where low-lift powered hand trucks are used because batteries are generally interchangeable and the same charging equipment can be used for both.

Operational Comment

Built along stacker lines, these trucks are a final development in a complete line of walkie trucks, although they now are made also in ride types.

5-B-3-d. Powered High-Lift Cantilever (Conventional) Fork Trucks

Principal Products Handled

Handling palletized loads of all kinds, from the lighest to the heaviest. Much wider applications than the stacker type of trucks. Utilized for extremely heavy duty as well as for light operations. Models are available for outdoor operations in yards and frequently are employed in such locations for handling lumber, pipe, heavy machines, motors, etc., on pallets.

Operational Comment

The conventional type of fork truck. Electric, gasoline, gas-electric and diesel models are now available and various kinds of tires make it possible to use these machines under practically any kind of operating conditions.

5-C. OTHER UNIT-LOAD SYSTEMS

5-C-1. Special Machines Employing Load-Carriers

5-C-1-a. End-Loading Trucks

Principal Products Handled

Handle pallets and bolsters on which are carried a wide variety of products such as lumber, pipe, machines, motors and other heavy equipment, barrels, drums, reinforcing bars, structural shapes, etc.

Typical Applications

Primarily for heavy-duty work in yards and over-the-road for loads up to as great as 30,000 lb. In lumber yards, refineries, ship yards, and similar locations where materials of the type they carry are handled in volume.

Operational Comment

These trucks do not elevate their loads beyond a distance required for transporting over rough terrain. They are frequently used for hauling and the tiering operation is then performed by fork trucks.

5-C-1-b. Side-Loading Trucks

Principal Products Handled

These, when equipped with forks, handle loads on pallets and also, as lumber, without any carrier. Fitted with cranes instead of forks, they handle such items as lengths of pipe in slings. Also, come equipped with special cable reels for handling power and telephone cables, etc.

Typical Applications

Used primarily for yard and over-the-road work, but also between and in buildings to pick up and deliver palletized or loose loads.

Operational Comment

At present heavy-duty models only are available, but it is anticipated that the same principle will be applied to smaller units for use in warehousing, etc.

5-C-1-c. Overhead Stacker Cranes

Principal Products Handled

Unit loads on pallets.

Typical Applications

In chemical plants, large warehouses with ample headroom, etc.

Operational Comment

A relatively newcomer in the materials handling field, this type of stacker requires very little aisle space, permits selectivity and can be made completely spark proof—hence its use where explosive fumes may be a hazard with other types of equipment.

5-C-1-d. Power Truck Fork-Lift Attachments

Principal Products Handled

Unit loads on pallets and such materials as lumber which can be carried on forks without a carrier.

Typical Applications

In locations where mobile power cranes operate—in yards, especially where the terrain is rough, wet or otherwise unsuited to conventional types of fork trucks.

Operational Comment

An extension of the unit-load handling system to powered mobile trucks, thus increasing their type of operation. They are able to tier unit loads to greater heights than are possible with conventional machines.

5-C-2. Special Attachments Not Employing Load Carriers

a-Fork Truck Special Carriages, b-Hoist & Crane Load-Carrying Devices

Principal Products Handled

Large articles which, either singly or in multiple units can be handled as a unit load. Special fork truck attachments or carriages handle barrels, drums, bales and similar articles without pallets. Hoists and cranes, provided with clamps, slings, tongs, etc., handle barrels, drums, flat sheets, etc.

Typical Applications

Employed where such products are handled, refineries, veneer plants, tanneries, etc.

Operational Comment

Represent the tendency, where feasible, to eliminate the necessity for pallets. The subject is being given concentrated study by materials handling engineers and others in the field. The objective is, of course, to reduce the investment required to handle unit loads by doing away with pallets.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

1 Haulage Systems

Means of pulling or pushing materials carried on surface-riding vehicles over horizontal or almost horizontal, fixed or mobile routes.

1-A. FIXED ROUTES

1-A-1. Truck Dragging Systems

Power-driven, endless cable- or chain-conveying systems to which industrial trucks or trailers can be attached, hauled over a fixed route, and disengaged at any desired destination.

These systems of handling must be carefully engineered to fit given physical and operating conditions. Optional types are

a. Overhead Trolley Chain or Cable Types
b. In-Floor Chain Type

APPLICATION

Used for hauling materials over relatively long distances on loading platforms or through buildings where there is no interference with other traffic.

Both types can be designed to operate over almost any desired route—straight, curved up to 180 deg, level, inclined, or declined. The loads usually, but not always, move unattended.

Frequently employed at railroad and truck terminals for handling l.c.l. freight, also in distribution warehouses for selecting and accumulating items for outgoing deliveries. Articles usually are placed on, and removed from, the load-carriers by hand.

This system can be integrated with others, especially the fork truck and pallet system; in which case, the conveyor takes over the transporting function for longer distances than are practical with fork truck equipment.

1-A-1-a. TRUCK DRAGGING SYSTEMS—

Overhead

Cable or Chain Trolley Types

A hanger-mounted, trolley conveyor system consisting of an endless track over which operate regularly-spaced trolleys attached to, and moved by, a powered endless cable or chain from which are suspended hooks or other means of engaging and disengaging industrial trucks or trailers.

APPLICATION—Where building characteristics and operating conditions are such that an overhead conveyor can function properly.

1-A-1-b. TRUCK DRAGGING SYSTEMS—

In floor

Type

An endless chain conveyor which runs directly under, and slightly below, the level of a slot in the floor over which the device is to drag industrial trucks or trailers. Connections between the drag and the load-carrier is made by means of a bolt or other coupling device at the front end of the latter which engages with the chain.

This system sometimes is referred to as an under-floor conveyor.

APPLICATION—Used for the same general purposes as the overhead types in locations where the under-floor-level feature makes it the logical choice. It has found its greatest acceptance in order-picking operations.

1-A-2. Industrial Railroads

Systems of trackage, locomotives and rail cars privately operated to serve a limited area. The term, here, is restricted to systems with relatively light rolling stock which operate on narrow gauge (4 ft 8½ in.) track.

APPLICATION

In wide-spread industrial areas, at wharves, etc., for transporting materials over relatively long distances.

The method is based on the sound principle of having a single, detachable motive unit haul a number of carriers. However, more flexible systems are gradually supplanting this method.

It is frequently tied-in with other systems; as when cars are loaded by cranes, and when it is used to transport unitized loads over long distances.

1-A-2-a. INDUSTRIAL RAILROADS—Locomotives

The traction units of industrial railroads. They are available with any desired source of power—diesel, diesel-electric, electric battery, third-rail, gasoline, gasoline-electric, or steam.

1-A-2-b. INDUSTRIAL RAILROADS—Cars

The load-carrying units of industrial railroads. The flatcar is the most widely used type, but others, such as

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

side- and bottom-dumpers, gondola, stake and crane cars are used for special handling operations.

1-A-3. Winches

(See 2-B-4, Elevating Systems)

1-B. VARIABLE ROUTES

1-B-1. Industrial Hand Trucks

Manually propelled, non-elevating vehicles used to transport materials by pulling or pushing over mobile, level or almost level routes.

Many types have been developed for specific handling purposes, but the prospective user can find one to fit almost any requirement from the many available in different combinations of sizes, weights, capacities, running gears, styles of superstructures, etc.

The following classification of industrial hand trucks is based primarily on their general characteristics, especially as to their running gear.

a. Dollies
b. Wheelbarrows
c. Two-Wheel Hand Trucks
d. Three-Wheel Hand Trucks
e. Non-Elevating Platform trucks

The specific trucks listed under each general type, on this and the following pages, are representative, rather than complete.

APPLICATION

The most universally used group of equipment in the materials handling field. In most instances, where operations have been largely mechanized, hand trucks still are used as the most economical means of moving light loads over short distances.

The amount of weight that can be handled efficiently with these devices depends upon whether they are moved by one or more men, the nature of the material itself (its density, etc.), the general design of the truck, arrangement of the running gear, type of bearings, lubrication, size and material of wheels, and working conditions (temperature, humidity, floor or ground surfaces).

1-B-1-a. INDUSTRIAL HAND TRUCKS—Dollies

Originally used to designate a small platform with a single roller, the term now includes any small, usually low, truck with one or more rollers, casters or wheels or a combination of these. The following are representative special-purpose types:

1. Furniture
2. Lever
3. Milk Case
4. Pallet or Skid
5. Paper Roll
6. Roller

APPLICATION—The use of dollies is restricted to very short distances. They are, however, helpful in moving machinery in plants, shifting furniture, etc.

They are used by warehousemen, truckers, merchants and many others for moving heavy objects a short distance (a few feet). Special dollies for handling unitized loads have been developed during the last few years.

1-B-1-a-1. DOLLIES—Furniture

Small triangular or rectangular, padded dollies with swivel casters, used by warehousemen, department stores and others for moving furniture. The all-caster running gear makes these trucks difficult to push in a straight path. They tend to creep sideways.

1-B-1-a-2. DOLLIES—Lever

Although this device has two wheels, it is usually classified as a dolly and is, therefore, included in this category. When the short nose of this dolly is pushed under the edge of an object, the long lever arm is lowered and the object is raised slightly. Sometimes used in pairs, one at each end, to move a heavy object over short distances. It could be called a mobile crowbar.

1-B-1-a-3. DOLLIES—Milk Case

Rectangular, angle-frame dollies fitted with wheels, used to move milk cases over short distances. Sizes are available to accommodate one to six cases.

1-B-1-a-4. DOLLIES—Pallet and Skid

Dollies designed for pushing pallets and skids. The roller type is available in two styles. One has rollers on the bottom only and is used for moving unit loads over short areas—as in unloading over-the-road carriers, hauling from the end of production lines to storage areas, etc. The other type has two sets of rollers, one permitting the load to be moved off at right angles to the line of travel.

1-B-1-a-5. DOLLIES—Paper Roll

Small, sturdy built, dollies with a curved recess to accommodate a roll of paper. Available in balanced four-wheel construction, with capacities up to 2000 lbs.

1-B-1-a-6. DOLLIES—Roller

Small dollies equipped with rollers, but not specifically designated to handle unit loads on pallets or skids. This type of running gear gives controlled motion along straight paths of travel, but cannot be used to turn through any but slight curves.

1-B-1-b. WHEELBARROWS

One of the earliest handling devices for hauling bulk materials. Wheelbarrows are manufactured of wood or metal and with single or dual front wheels. Pneumatic tires make for easier handling, especially over rough surfaces. Widely used in boiler rooms, shops, on construction work, etc.

1-B-1-c. HAND TRUCKS—Two Wheel

These trucks apply the principle of the lever in a practical way to enable a man to handle and move heavier loads than he can manipulate with his unaided muscles. The fulcrum of the lever system is at the axis of the wheels. The load frequently extends forward of this point and, hence, part of the load's weight counterbalances the portion lifted by the operator.

Types are available with one or two handles, metal, rubber or composition wheels, and other variations to fit

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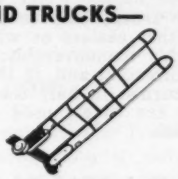
particular requirements. The following are representative types:

1. Appliance
2. Bag
3. Baggage
4. Barrel
5. Cable Reel
6. Cannery
7. Carboy
8. Caterpillar
9. Chisel
10. Combination
11. Cotton
12. Cylindrical Tank
13. Lift
14. Stevedore
15. Tote Box
16. Utility
17. Warehouse—Eastern, Western

APPLICATION—Usually limited to loads of between 400 and 500 lbs. and distances up to 150 ft. Warehousemen, stevedores, merchants and operators in plants are among the almost universal users of two-wheel trucks.

I-B-1-c-1. TWO-WHEEL HAND TRUCKS—Appliance



A truck characterized by its broad, rectangular frame and blunt nose. The frame parts are covered with rubber or other protective material where contact is made with the load. Canvas belts are attached to make the load fast during handling operations.

Used by retailers, jobbers, warehousemen and others for moving refrigerators, radios, television sets, kitchen cabinets and other household appliances which have easily damaged surfaces.

I-B-1-c-2. TWO-WHEEL HAND TRUCKS—Bag

Designed to facilitate the safe handling of bagged goods, these trucks have all-smooth construction, relatively deep noses and wheels set inside the frame, or otherwise guarded to afford complete protection against chafing.

I-B-1-c-3. TWO-WHEEL HAND TRUCKS—Baggage

A light construction truck used by porters in handling passengers' baggage in depots.

I-B-1-c-4. TWO-WHEEL HAND TRUCKS—Barrel

Specially-designed trucks intended to permit one-man handling of barrels. The toes slip under the chime of the barrel and, as the truck handles are moved down, the barrel settles on the truck.

Models are available with hoops or with clamps to aid the operator. The hoop type does not subject the barrel to any strain. The clamp type is especially useful in handling drums, but is not recommended for handling barrels with fabric covers over the loads, as are frequently seen in produce markets.

I-B-1-c-5. TWO-WHEEL HAND TRUCKS—Cable Reel

A single-purpose truck designed to engage the trunnion of a cable reel, elevate the reel slightly when the handles are depressed and, thus, permit it to be carried a short distance. Made in various sizes to handle reels up to 48 in. in diameter and 32 in. wide.

I-B-1-c-6. TWO-WHEEL HAND TRUCKS—Cannery

The distinguishing feature of this truck is its upright frame. In some models the side frame comes in contact with the load; in others, uprights are added to provide vertical sides.

Used widely in food processing and bottling industries for handling tiered cartons or cases.

I-B-1-c-7. TWO-WHEEL HAND TRUCKS—Carboy

A small truck equipped with carrying arms—actuated by a foot pedal—which engage, elevate and support the carboy during travel. Made in sizes to fit all standard carboys.

I-B-1-c-8. TWO-WHEEL HAND TRUCKS—Caterpillar

A relatively new type of hand truck designed to facilitate the handling of loads up and down stairs. A caterpillar tread extends lengthwise for a short distance along the underside of the two side frames. The truck rides on these treads in moving from step to step. Smooth travel results instead of bumping from step to step when more conventional types of hand trucks are used.

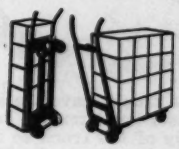
Frequently used in handling beverage cases.

I-B-1-c-9. TWO-WHEEL HAND TRUCKS—Chisel

This truck has a smooth, flat nose which can be easily pushed under boxes, crates, machine parts, etc., to assist in positioning them on the truck. The truck acts as a pry, but is considerably larger than the Lever Dolly.

(See I-B-1-a-2 above.)

I-B-1-c-10. TWO-WHEEL HAND TRUCK—Combination



A two-wheel truck which can be used in the regular way to transport materials, and as a jack for a semi-live skid.

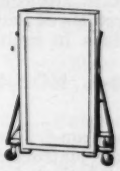
I-B-1-c-11. TWO-WHEEL HAND TRUCKS—Cotton

A truck with toed-in prongs which facilitate the handling of cotton, waste and other materials in bales.

I-B-1-c-12. TWO-WHEEL HAND TRUCKS—Cylindrical Tank

A hand truck designated to carry one or more cylinders of gas in an upright position. An adjustable chain holds the load in place during handling.

I-B-1-c-13. TWO-WHEEL HAND TRUCKS—Lift



This truck is not to be confused with the true lift-type trucks. Its lifting action is not mechanical. It is used for raising slightly and moving large crates, etc.

I-B-1-c-14. TWO-WHEEL HAND TRUCKS—Stevedore

This is not a true class of trucks. It includes almost any truck which is used in stevedoring operations. Most stevedores have a favorite type which they consider to have the best "feel" for their work, and it might be any one of a variety of sturdy, heavy-duty trucks.

I-B-1-c-15. TWO-WHEEL HAND TRUCKS—Tote Box

A special-purpose truck equipped with two lever arms which extends forward and engage lugs on the side of a tote box. When the arms of the truck are lowered, the box is lifted clear of the floor.

Widely used in manufacturing plants for moving small parts from machine to machine and into storage areas.

I-B-1-c-16. TWO-WHEEL HAND TRUCKS—Utility

A wide variety of two-wheel trucks of light construction (frequently of magnesium or aluminum) designed to handle loads up to 100 lbs., such as small articles, cartons, parcels, baggage, etc.

I-B-1-c-17. TWO-WHEEL HAND TRUCKS—Warehouse

These trucks are the most widely used general-purpose two-wheel hand trucks. They are made in two styles. The

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Eastern (also called the New York Style) has a tapered frame, narrower at the top than at the bottom, and the wheels set outside of the frame. Wide metal plates protect the load from contact with the wheels.

The Western Style, on the other hand, has a straight frame and the wheels are set inside the frame.

I-B-1-d. THREE-WHEEL HAND TRUCKS

These trucks have the same general construction as the two-wheel hand trucks, but a third wheel is added under the body of the truck so that the load is carried on three instead of two wheels. The operator's arms are relieved of having to carry the load.

I-B-1-e. NON-LIFT PLATFORM TRUCKS

This class sometimes is called floor trucks. The one common characteristic of this large class of hand trucks is their flat, non-elevating, rectangular carrying surface.

Models are available with practically any desired combination of size, capacity, material or construction, running gear, upper structure, wheel size, material and lubrication. A few representative types are:

1. Baggage
2. Box
3. Four-wheel
4. Fifth-wheel Steer
5. Six-wheel

APPLICATION—Still widely used for hauling an infinite variety of materials over relatively short distances. In certain situations they are integrated with the unit-load systems of handling, as, for instance, in some elevator operations in multi-storied buildings.

I-B-1-e-1. NON-LIFT PLATFORM TRUCKS—Baggage

This drop-frame type of truck is still seen on most railroad platforms and baggage rooms. It has handle pulls at both ends and the trailing end can be made fast so that steering is done from the front, or lead end, only.

I-B-1-e-2. NON-LIFT PLATFORM TRUCKS—Box

These castered trucks with box superstructures are widely used in the textile, laundry and similar industries. They are lightly but sturdily built with sides of various kinds of materials, such as wood and pressboard.

I-B-1-e-3. NON-LIFT PLATFORM TRUCKS—Four-Wheel

A truck equipped with four rigid wheels at the four corners and cannot be steered. If, however, the wheels are mounted one on each side, with one pair larger than the other, the truck can be swiveled on the larger center wheels. Other wheel arrangements for this type of truck are available.

Care must be taken in loading this type of vehicle, so that weight is not accumulated too heavily on any one corner or the truck may tip over. Trucks of this type are not as stable as either the fifth-wheel steer or six-wheel types.

I-B-1-e-4. NON-LIFT PLATFORM TRUCKS—Fifth-Wheel Steer

The fifth-wheel of this type of running gear is not a true wheel. The two rear wheels are fastened to a rigid axle. The front wheels are mounted on an axle to which a draw handle is attached for steering as a unit through a king pin, bearing plate or ball raceway.

The truck can be turned in its own length, but not in as small a circle as the true four-wheel and six-wheel types. It is difficult to maneuver when being pushed backwards.

I-B-1-e-5. NON-LIFT PLATFORM TRUCKS—Six-Wheel

These trucks balance on their two center wheels and have either casters or wheels at the four corners. They are highly maneuverable, can be pushed equally well in either direction and, if the load is well balanced, can be easily turned in half their length.

They are widely used in the warehousing and textile industries.

1-B-2. Skid Platforms

(See Under V—SELF-LOADING SYSTEMS)

1-B-3. Powered Industrial Trucks

A group of trucks which are, for the most part, powered models of industrial hand trucks. Not included here are the trucks associated with the handling of unit loads on skids or pallets, for which see V—SELF-LOADING SYSTEMS.

APPLICATION

Used in hauling a wide variety of materials over longer distances than are possible with manually-propelled equipment. Typical types are:

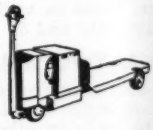
a. Powered Wheelbarrow
b. Powered Three-Wheel Hand Truck
c. Powered Non-Lift Platform Truck

I-B-3-a. POWERED INDUSTRIAL TRUCKS—Wheelbarrow

Powered wheelbarrows are similar to their manual counterparts with three, instead of two, wheels; the extra wheel being swiveled for steering.

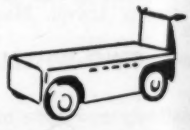
Capacities up to 18 cu. ft. and 1000 lbs. are available. Pneumatic tires are used and the power usually provided by a gasoline engine. They are especially useful where there are ramps.

I-B-3-b. POWERED INDUSTRIAL TRUCKS—Three Wheel



There are no two-wheel powered trucks. A third wheel is needed to help carry the added weight of the power unit. Both riding and non-riding types are available.

I-B-3-c. POWERED INDUSTRIAL TRUCKS—Non-Lift Platform



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A group of powered industrial trucks designed purely for hauling. The operator usually stands or sits on the truck while it is in motion and its speed is, therefore, greater than that of a man walking. Electric, gasoline and gas-electric models are available.

Two types of frames are used:

1. *Drop-Frame Type* with a carrying platform close to the ground, and the driving mechanism and controls above the level of the platform. Capacities range from 1000 to 6000 lbs. A special model is seen in the baggage truck which has a drop frame, but it also has driving mechanism and controls at both ends; instead of at one end only, as in more conventional types.

2. *Straight-Frame Type* has its driving mechanism under the carrying platform. If manually loaded, this type requires a higher lift than the drop-frame type.

APPLICATION—Used to haul heavier loads over longer distances than is possible with man-power alone.

1-B-4. Trackless Trains

Often referred to as Tractor-Trailer Trains, this is a system of handling, comprising a detachable power unit (a tractor) and one or more burden carriers (the trailers).

APPLICATION

Used in hauling miscellaneous loads over considerably longer distances than are practical with other hauling systems. The fact that the power unit is separate from other elements permits it, when the work is well planned, to keep active by serving more than one train of trailers.

A tractor-trailer train is able to maneuver well through relatively narrow aisles, doors and passageways. Although the train performs well on up grades, means must be provided to keep the trailers from getting out of line on declines. It frequently is integrated with unit-load systems; as, when loaded pallets are placed on trailers by a crane, fork truck or other mechanical means, or when the unit loads are created on pallets placed on the trailers.

1-B-4-a. INDUSTRIAL TRACTORS

Self-propelled, trackless vehicles which haul one or more trailers. The types used in and around plants, wharves, warehouse, terminals, etc., usually are wheel-mounted; whereas the caterpillar-tread variety are employed in heavy, outdoor hauling. Several light-duty tractors, powered by electric batteries or gasoline engines, have been developed.

It should be observed that almost any powered industrial truck, such as a fork truck, can be equipped with a coupling and used to draw trailers. We are here considering, however, machines designed primarily for traction purposes. These are classified as:

1. Light-Duty
2. 3-Point Contact
3. 4-Point Contact

1-B-4-a-1. INDUSTRIAL TRACTORS—Light Duty

These small self-propelled tractors are used for many hauling operations, including trailer trains, in locations where the heavier types would not be economical. They are made in both non-riding and riding varieties.

Like many other small trucks, they are frequently referred to as being of the "walkie" family, a designation which has become too limiting, since riding models have been brought out.

1-B-4-a-2. INDUSTRIAL TRACTORS—3-Point Contact

This type of tractor usually is lighter, has less drawbar pull, and is more maneuverable (in that it can turn in a shorter radius) than the 4-Point variety. While it is generally built with three wheels, there may be more. The rear wheels can be dual, and the front steering element may be made up of two wheels which turn and steer as a single wheel.

Electric battery, gasoline, diesel, gas-electric or diesel-electric models are offered. The operator may be located either in the front, center or rear. Solid or pneumatic tires are provided.

APPLICATION—Because of its maneuverability and relative narrowness, it is usually employed to draw trains of trailers inside plants, warehouses, terminals, etc.

1-B-4-a-3. INDUSTRIAL TRACTORS—4-Point Contact

ELECTRIC

GAS

These self-propelled vehicles may be equipped with four or six wheels, arranged to provide rear or front and rear wheel steer. They generally are heavier and have greater drawbar pull than the 3-point models. They also are available in the same choices of motive power as the 3-point type

APPLICATION—Because of their heavier construction and less maneuverability, they usually are employed in open yard work, on wharves, and similar locations.

1-B-4-b. INDUSTRIAL TRAILERS

Load-carrying vehicles which, when equipped with some kind of coupling device, can be made up into trains for hauling by a powered tractor. Several different types are used.

The following classification is based on the running gear employed, this being the element which is most important from the standpoint of the trains "trailing ability."

1. Balanced
2. Caster Steer
3. 4-Wheel Steer
4. 5th-Wheel Steer

1-B-4-b-1. INDUSTRIAL TRAILERS—Balanced

These trailers are equipped with four wheels, usually with swivel-end wheels and larger center wheels. They are highly maneuverable, but must be properly coupled to trail well.

Frequently employed in plants and terminals for hauling light loads.

1-B-4-b-2. INDUSTRIAL TRAILING—Caster Steer

Two caster wheels at the front end, and two rigid wheels at the rear, comprise the running gear. These trailers are highly maneuverable, but there is a tendency for them to "creep" slightly when being hauled in trains.

They are not reversible; that is, they cannot be coupled together and hauled from either end of the train. Employed in terminals and industrial plants.

1-B-4-b-3. INDUSTRIAL TRAILERS—4-Wheel Steer

These trailers are equipped with four wheels of equal size, with front and rear axles mounted on fifth wheels—or the wheels are mounted on knuckle steers and all four connected by cross linkages, so that they steer simultaneously. They have a draw bar which can be attached to either end.

This is the most accurate trailing vehicle of the tractor group. The train can be hauled from either direction.

1-B-4-b-4. INDUSTRIAL TRAILERS—Fifth-Wheel Steer

Trailers of this type employ the conventional 5th-wheel steer. They do not trail as accurately as the 4-wheel steer or caster-steer varieties, but more accurately than the balanced wheel type. They are usually employed for hauling heavy loads over long distances.

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2 Elevating Systems

Means of lifting and lowering materials vertically, or at very steep inclines, by machines which operate either with continuous or with intermittent motion.

2-A. CONTINUOUS MOTION

Elevators which operate vertically with continuous motion and, therefore, discharge their loads in an almost steady flow. There is but one general type in this category, Vertical Conveyors.

2-A-1 Vertical Conveyors

Conveyors as a group included in Section 3—CONVEYING SYSTEMS.

However, those which operate vertically, or at very steep inclines, fall in the category of ELEVATING SYSTEMS.

All vertical conveyors are powered and are of the chain type, although some also can be made with a belt. They can be designed to load and unload automatically and, some, to both lift and lower their loads.

Vertical conveyors frequently are part of a system employing other types of materials handling equipment. They must be engineered to fit given conditions. The following are distinctive types:

a. Arm
b. Bucket
c. Push-Bar
d. Suspended Carriage

2-A-1-a. VERTICAL CONVEYORS—Arm

Powered, vertical conveyors employing two or more endless chains to which are attached regularly spaced, horizontal arms or platforms.

Generally designed only to lift; in which case the arms or platform discharge their loads after passing over the head end and are, therefore, upside down on the return trip. Arms may be straight for carrying flat-surfaced goods or curved to accommodate such articles as barrels and rolls.

When designed to lift, they can pick up loads from slotted surfaces through which the arms pass in rising. Those which lower their loads, can discharge them on similar surfaces. Pivoted arms can be provided; which are tripped during elevation and, thus, discharge their loads on the same side as they receive.

Speeds are relatively slow—30 to 60 ft per min—depending on the product being handled and the methods used in feeding and discharging.

APPLICATION—Widely used for elevating bags, barrels, cartons, rolls of paper and textiles, and similarly packaged articles. Light platform or tray models are used for transferring papers and light loads between floors in offices and plants.

2-A-1-b. VERTICAL CONVEYORS—Bucket

Powered, vertical elevators employing one or more endless chains, or an endless belt, to which are attached regularly spaced buckets.

Materials are discharged after the buckets have passed over the head-end of the conveyor in one of four ways:

1. Centrifugal discharge, by running the machine at relatively high speeds—150 to 400 ft per min, depending on the nature of the product.
2. Continuous discharge, by using buckets with chute-shaped bottoms, so that, when the material is just past the head-end, it falls by gravity onto the bottom of the preceding bucket; from there it passes to another conveyor, to a chute, or drops into a receptacle. Maximum speed is 100 ft per min.
3. Gravity discharge, by having a deflecting idler on the discharge side to catch the material and further direct its flow.
4. Tripping discharge, by using pivoted buckets which rise vertically and then move in an inclined or horizontal direction to the point of discharge, where they are tripped and empty their loads. The most usual type of portable machine has centrifugal discharge.

APPLICATION—Extensively used to elevate loose, free-flowing materials such as coal, chemicals, ores and grains. These machines are frequently tied in with other types of conveyors and chutes.

2-A-1-c. VERTICAL CONVEYORS—Push-Bar

Powered, vertical conveyors employing two endless roller chains between which are mounted regularly spaced cross members or bars; usually lengths of pipe or tubing. The bars run parallel to, and above, a slide or roller bed at a height dependent on the size of the item to be lifted. Horizontal sections are usually employed to feed and remove materials.

Guards must be provided to keep the loads from falling off the conveyor during elevation. Height, spacing and speed (as high as 9 ft per min) of bars must be engineered to fit the product to be handled. Portable models which operate at sharp inclines are available.

APPLICATION—Used primarily for elevating uniform packages in canneries, food processing and bottling plants.

2-A-1-d. VERTICAL CONVEYORS —Suspended Carriage

Powered vertical conveyors employing two endless roller chains between which are regularly spaced horizontal devices with pivoted hinges for carrying suspended platforms or trays, which remain horizontal on both the lifting and the lowering sides of the machine. Horizontal as well as vertical paths of travel can be provided.

Loading and unloading usually are done by hand, but can be made automatic. Portable models are not offered.

APPLICATION—Used in manufacturing plants to handle small units (such as tote-boxes and pans) and in wholesale houses, paper converters and textile plants for moving light loads.

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2-B. INTERMITTENT MOTION

Elevators which operate vertically with intermittent motion and, therefore, do not discharge their loads in a steady flow. The lifting-lowering element follows the same vertical path in both directions. The following are typical:

1. Fixed-Arm Cranes
2. Fixed-Boom Derricks
3. Fixed Hoists
4. Winches.
5. Stackers
6. Levelers
7. Elevators

2-B-1 Intermittent-Motion Elevators —Fixed-Arm Cranes

Cranes, as a group, are included in Section 4—TRANSFERRING SYSTEMS. There are, however, some types with fixed arms which provide means of supporting a lifting device, such as a hoist, to elevate materials vertically and cannot move the load horizontally. Cranes of this type are:

a. Wall Cranes
b. Floor Cranes

2-B-1-a. FIXED-ARM CRANES—Wall Cranes

Cranes with fixed arms, usually of the jib type, which are rigidly mounted on walls or columns as supports for a hoisting device.

APPLICATION—Frequently found in machine shops for lifting and positioning work or dies, maintenance departments, and over hatchways or outside buildings for raising materials.

2-B-1-b. FIXED-ARM CRANES—Floor Cranes

Cranes, usually of the pillar or goose-neck types, mounted on the floor and serving as an overhead support for a hoisting device. Some models are so constructed that the arm itself does the lifting. Portable models are designed primarily for lifting and lowering loads and not for transporting them.

APPLICATION—Used for the same general purpose as the wall types. Portable models are more widely used than those permanently installed.

2-B-2 Intermittent-Motion Elevators —Fixed-Boom Derricks

Derricks as a group are to be found in Section 4—TRANSFERRING SYSTEMS. Certain types with fixed booms provide vertical motion only and are, therefore, included here. Pole, rigid A-frame, and tripod derricks can be so set up that they act as fixed supports for hoisting tackle. Winches are generally employed as the lifting element. Portable models are available, but are not intended for transporting their loads.

APPLICATION

Although most widely used in construction operations, they also are employed in warehouses and other locations for lifting loads vertically.

2-B-3 Intermittent-Motion Elevators —Fixed Hoists

A hoist is a mechanical device, usually mounted overhead, which lifts or lowers suspended loads vertically. Hoists are used with monorails and cranes as the elevating element, (See Section 4—TRANSFERRING SYSTEMS). They also can be rigidly mounted to provide vertical-lift only. There are four types:

a. Manually Operated
b. Air Operated
c. Electrically Operated
d. Whip Hoists

2-B-3-a. FIXED HOISTS—Manually Operated

Fixed hoists which are actuated by manpower. There are five types:

1. Block and Tackle
2. Ratchet
3. Differential
4. Screw Geared
5. Spur Geared

2-B-3-a-1. MANUALLY-OPERATED FIXED HOISTS —Block and Tackle

Hoisting mechanisms consisting of one or more grooved pulleys or sheaves mounted in a frame, which is provided with a rope, suspension hook, eye or strap. The rope passes over the pulleys or sheaves, and provides the means of supporting the load and of applying the necessary man power for elevating it.

APPLICATION—This simplest of all hoisting devices is still widely used for relatively light lifting tasks.

2-B-3-a-2. MANUALLY-OPERATED FIXED HOISTS —Ratchet Types

Known also as Pullers, the manually-operated chain hoists employ a ratchet handle, a sprocket, a chain and hooks for suspending the hoist and the load.

APPLICATION—These one-man machines are used in maintenance and repair work; as in lifting machines or their parts. Hoisting speeds are slow—from 3 in. to 4 ft per min. Capacities range from ¾ to 15 tons.

2-B-3-a-3. MANUALLY-OPERATED FIXED HOISTS —Differential Types

Chain hand hoists employing an endless chain which runs over two sets of sheaves. There is an upper, or differential, sheave and a lower sheave. The latter is supported in a pendant portion of the chain, which is provided with a yoke from which is suspended a hook for supporting the load.

Raising and lowering are accomplished by pulling on the proper side of another pendant loop in the endless chain. Loads are prevented from falling, when the operator releases the chain, by the friction in the gear system.

It is the least expensive but, also, mechanically the least efficient—25 to 30 percent—of the hand-chain hoist group.

APPLICATION—Used throughout industry for performing intermittent lifting operations where speed is not a factor and infrequency of performance does not warrant investment in more expensive types.

2-B-3-a-4. MANUALLY-OPERATED HOISTS —Screw-Geared Types

Known also as worm-geared hoists, these hand chain-hoists employ two chains. An endless chain runs over a grooved wheel and is pulled by hand to raise and lower

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the load. The wheel is mounted on the shaft of a worm gear which engages another worm, on whose shaft is mounted a sheave over which runs a second chain. The open ends of this chain are attached to a clevis with a hook from which loads are suspended.

Although more expensive than differential hoists, this type is more efficient, but slower. It operates very smoothly in capacities from ½ to 3 tons. Friction in the gear systems furnishes braking.

APPLICATION—Used generally throughout industry where slightly greater efficiency justifies the increased cost over the differential type.

2-B-3-a-5. MANUALLY-OPERATED HOISTS —Spur-Geared Types

Hand chain-hoists employing two chains. The hand chain is endless and runs over a sheave which, in turn, actuates a mechanism composed of triple gears—planetary or gyratory—enclosed in a gear box. The gear system actuates the load sheave over which runs the load chain, at free end of which is attached a load hook.

This is the most expensive but, also, the most efficient type of geared chain hoist—as high as 85 percent. It is, also, the fastest type of hand chain hoist—capacities as high as 40 tons are available.

APPLICATION—For hand-hoisting work where both speed and mechanical efficiency are desirable factors to offset the investment.

2-B-3-b. FIXED HOISTS—Air Operated Types

Often referred to as Pneumatic Hoists, their lifting element is a mechanism actuated by compressed air.

Air hoists have distinctive advantages. They are simple to operate, require little maintenance, give excellent speed control and are non-sparking. They are, however, relatively more costly to operate than electric hoists because of loss of efficiency in compressing and transmitting compressed air. There are two types:

1. Air Cylinder
2. Air Motor

2-B-3-b-1. AIR-OPERATED HOISTS —Air-Cylinder Types

Hoisting devices employing a cylinder, piston and valves. The actuating medium is compressed air, its flow controlled by an operator's valve. Single acting, air-balanced and double acting types are offered.

When pendant mounted, air-cylinder type hoists use considerable space above the height of lift. But when mounted horizontally, they require but little headroom.

APPLICATION—They are widely used in foundries and chemical plants because of their sensitive controls or their non-sparking feature.

2-B-3-b-2. AIR-OPERATED HOISTS —Air-Motor Types

Air hoists in which a motor, actuated by compressed air, comprises the lifting mechanism. This type requires less headroom than the pendant air-cylinder type and has, therefore, a longer lifting range.

APPLICATION—The same general uses as the air cylinder type, but the extreme sensitivity of control—from creeping to full speed—and low headroom, makes this type the choice where these features are desirable.

2-B-3-c. FIXED HOISTS— Electrical Types

Electrically operated hoists consisting of an electric motor, gear system, a chain and sprocket or a cable and drum, brakes and controls.

The operator can control the hoist either from near the machine (pendant-rope or pendant push-button) or from a distance (remote push-button or electronic). Fixed electric hoists are equipped with a hook or with lugs for overhead installations.

APPLICATION—Chain hoists are used for medium-duty lifting, while cable (wire rope) hoists are for heavy-duty work, capacities up to 12 tons being available.

Widely used to lift many kinds of materials vertically more speedily than with other types and without, of course, any physical effort on the part of the operator.

2-B-3-d. FIXED HOISTS—Whip Hoists

Although these hoists are electrically powered, they have a unique feature which places them in a class by themselves. A whip hoist is a cable hoist so constructed that the load can be lifted at a considerable angle from the vertical without injury to the cable, as would be the case with conventional type hoists.

Models with 30 deg leeway are available. Although usually trolley-mounted, they can be installed as stationary, overhead hoists.

APPLICATION—Especially useful in increasing the reach of a cable hoist, so that materials can be picked up from locations which are not directly under the load hook.

2-B-4 Intermittent-Motion Elevators —Winches

Winches are hoisting machines, usually floor mounted, employing one or more drums, a manila rope or a wire cable, and a means of turning the drum so that it will revolve and wind the rope or cable on itself. Based on the power employed, winches are classified as:

a. Manually Operated
b. Electric Motor Operated
c. Fuel or Steam Engine Operated

2-B-4-a. WINCHES—Manually-Operated Types

Winches powered by hand. Several methods are used to apply the manpower—a hand crank wheel or a hand chain wheel being the most usually employed.

APPLICATION—For lifting or, by combining with pulleys or sheaves, for moving relatively light loads in situations which do not warrant investment in speedier, more efficient hoisting equipment.

2-B-4-b. FIXED WINCHES—Electric Types

Electric winches are similar in construction to electric cable hoists, except as to the mounting used. Instead of having top hooks or lugs, winches are equipped with suspension frames suitable for floor, wall or ceiling mounting.

The hoist drum may be either single or double reeving. Specially constructed, non-spinning wire is used to prevent the load from turning during elevation. By running the cable or cables over different arrangements of sheaves or pulleys various lifting, lowering and pulling motions can be secured. Capacities up to 3 tons.

APPLICATION—Used either alone or with cranes and derricks and with sheaves, to open heavy furnace doors, in loading and unloading ship's cargoes, in assembly-line operations and, horizontally, as car pullers.

2-B-4-c. FIXED WINCHES— Fuel or Steam-Engine Operated Types

Winches of this type are powered by diesel, gasoline or steam engines. They are sturdily constructed for heavy duty.

APPLICATION—Used largely for outdoor work, as on construction jobs, at ship terminals and on ships themselves combined with various types of cranes and derricks.

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2-B-5 Intermittent-Motion Elevators —Stackers

Known also as Tiering Machines and Portable Elevators, Stackers are elevating machines employing a frame structure with two masts, or posts, between which moves a carriage with a cantilever platform or other supporting device. A base extends under the load and, thus, supplies stability.

Although these machines fall in the elevator group they are not in the same category as Freight Elevators (See 2-B-7, below). They are, in most instances, portable but not self-propelling. They were the prototype of the high-lift platform and pallet machines included in Section 5—SELF-LOADING SYSTEMS.

Stackers may be manually or electrically powered, the latter receiving their current from a light or power line in the work area. The masts may be rigid, hinged or telescopic to meet given requirements.

The bases of stackers may be either fixed or revolving, the latter permitting loads to be placed on the machine from one direction and removed from another. Different types of platform include plain or roller surface, side or end dumping, and others.

APPLICATION

Although stackers have been displaced in most instances where unit-load handling methods have been adopted, they are still used where these systems are not applicable. They also are used in maintenance work—as in changing electric light bulbs, repairing overhead pipes and fixtures, etc.

2-B-6 Intermittent-Motion Elevators —Levelers

Mechanism designed to raise and lower loads a few feet. They may be manually operated, or electrically powered with mechanical or hydraulic lifting mechanisms.

APPLICATION

Usage has divided these levelers into two types—floor levelers and work levelers. Floor levelers are intended to raise loads to compensate for differences in floor levels. Work levelers are made to elevate, lower or hold work at convenient levels.

Since the advent of mechanized handling, floor levelers have been widely used in old buildings to eliminate the need for ramps. They also are employed to lift loads to motor carrier beds, either from ground level or where docks are not sufficiently high.

Work levelers are useful in feeding materials to and from machines in production lines. They are especially useful when arranged to lift and lower automatically when such items as sheets of metal or fibreboard are being handled and the stock pile diminishes or increases.

2-B-7 Intermittent-Motion Elevators

Mechanical devices designed to lift and lower materials in the same vertical path of travel and with their loads supported on carriers.

Elevators of this type are usually permanent installations. They are available in practically any size, capacity or speed. Typical elevators are:

a. Dumb Waiters
b. Skip Hoists
c. Freight Elevators

2-B-7-a. ELEVATORS—Dumbwaiters

Small, usually manually-operated, elevators employing an endless rope, sheave and carrier or tray.

APPLICATION—A low investment type of elevator for moving relatively light loads—papers, blueprints, etc.—between floors of offices, plants and warehouses.

2-B-7-b. ELEVATORS—Skip Hoists

Originally, a system of handling used in coal mines consisting of a small car—a skip—mounted on wheels so that it runs on inclined tracks and is pulled by a rope or cable actuated by a winch. The skip can be tripped during elevation and thus discharge its load.

The term has been extended to include a method of using skips—cars or buckets—to elevate materials vertically in industrial plants.

The system can be composed of a single, unbalanced skip, a single, counterbalanced skip, or two balanced skips. The skips travel in the same path during ascent and descent and are, therefore, true elevators.

APPLICATION—In addition to their use in coal fields, a box type skip hoist is used for elevating packaged goods in cartons or bales and discharging them from either the same or opposite side received.

The bucket types are widely used in blast furnace operations for lifting charges of ore, limestone and fuel.

2-B-7-c. ELEVATORS—Freight Elevators

Sometimes called Floor-to-Floor Elevators or Lifts, they are used to move freight and other relatively heavy loads between floors of buildings or other locations; as, from a basement to street-level.

Installations are usually subject to regulatory codes, which must be rigidly followed. The following are the usual types:

1. Hydraulically Operated
2. Electrically Operated

2-B-7-c-1. FREIGHT ELEVATORS— Hydraulic Types

Elevators which are raised and lowered by utilizing the pressure of a fluid contained in a cylinder acting on a piston or plunger. These elevators require no overhead housing for their operating mechanism.

They are designed primarily for serving buildings with up to four stories. Speeds are relatively slow.

APPLICATION—In plants, garages and warehouses of limited heights, where car speed is not too important a consideration.

2-B-7-c-2. FREIGHT ELEVATORS—Electric Types

This is the most widely used type of elevator employed in industry, terminals and warehouses for handling freight between floors of buildings. Their importance has increased with the introduction of mechanical handling and, when inadequate, are frequently bottle-necks in the flow of materials.

During the past few years manufacturers have greatly improved their construction to withstand the severe shocks imposed by heavy handling machines and increased loads. Special models frequently are installed in congested, metropolitan areas for elevating goods from basements to sidewalks.

When roller gravity conveyors are laid on building floors, and on the elevators themselves, they provide a means of accumulating materials before and after loading, and for handling on and off the cars without the use of powered machines.

All elevators of this type must be carefully engineered to meet requirements both as to proposed uses and local building codes.

APPLICATION—In practically all multi-storied buildings where freight or heavy loads are handled.

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3 Conveying Systems

Means of moving materials over horizontal, inclined or declined fixed routes by the force of gravity or by power.

3-A. GRAVITY CONVEYORS

Devices for lowering materials down fixed declined routes by the force of gravity acting against sliding or rolling friction. There are two types:

1. Sliding-Friction Conveyors
2. Rolling-Friction Conveyors

3-A-1. Sliding-Friction Conveyors

Conveyors in which the force of gravity moves materials against sliding friction. There are two types:

a. Skids b. Chutes

3-A-1-a. SLIDING-FRICTION CONVEYORS

Skids

Portable devices used to slide materials from higher to lower levels.

Skid boards have flat or concaved surfaces, either wood or metal and, usually, guards along the sides to keep materials from falling off, and handles to facilitate carrying.

Barrel skids consist of two runners of wood or metal, which usually are connected by cross members to keep them properly spaced. Hooks may be provided at the upper ends to make the skid fast during use.

These devices are the simplest means of providing declined motion.

APPLICATION — Skids are used for moving light packages or loose materials. The barrel type is intended for lowering barrels and kegs, especially by truckmen, but are also employed in freight car operations and in breaking out merchandise from piles in storage.

Where more permanent equipment is required chutes are installed.

3-A-1-b. SLIDING-FRICTION CONVEYORS— Chute

Chutes are less general-purpose devices than skids. They usually are designed to convey specific kinds of materials and are permanently installed.

They are economical because of their relatively low initial investment and maintenance cost and they do not require any power. There are three types:

1. Plain Chutes 2. Flexible Chutes
3. Spiral Chutes

3-A-1-b-1. CHUTES—Plain

Plain chutes are straight or curved, and are made with flat or concaved surfaces. Usually constructed of wood or sheet metal, but the surface can be of any other material, such as a plastic, or treated to provide proper friction between it and the material to be moved.

The coefficient of friction of the surfaces in contact determines the incline required to secure free sliding. But it may vary with changes in conditions, as when cartons absorb moisture. The increasing velocity of the sliding material limits the practical length of a plain chute.

When installed for floor-to-floor operation, they are frequently hinged at the upper end and counterweighted so they can be swung overhead when not in use. This is a desirable arrangement, because plain chutes are wasteful of space. They often are used as part of a complete system to provide economical declines.

APPLICATION—Very extensively used to direct the flow of loose or packaged materials and individual articles; as in feeding materials into storage bins, lowering merchandise from one floor to another, and in directing small parts as they are ejected from production machines.

Their use is limited, of course, to materials which can slide and not be damaged by so doing; nor be affected by collisions, should there be a back-up on the line. When packages are to be removed manually, provision must be made to prevent injury to the workers' hands.

3-A-1-b-2. CHUTES—

Flexible

Flexible chutes are those which are so constructed that the flow of materials may be directed to selective discharge points. They are usually tubular, and made of canvas, jointed sheet metal, sections or hose, depending on the kind of material to be handled.

APPLICATION—Widely used for directing the flow of loose, free-flowing materials; as grains and flour, and for bagged goods in such operations as ship loading and unloading, and in moving materials to and from storage receptacles.

3-A-1-b-3. CHUTES—Spiral

Friction chutes whose surfaces, called blades, follow the form of a helix or spiral. Their function is to provide means of lowering materials in a more restricted area and with better control of the rate of fall than can be done with plain chutes.

Spiral chutes usually are made to serve a number of floors, and can be designed with intermediate receive and discharge stations. The blades may have flat or concaved surfaces. They also may be single, double or triple, ar-

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ranged around a standpipe, open core or enclosed. The width of the blades and their pitch must be engineered to the materials they are to handle.

APPLICATION — Frequently employed in wholesale establishments for assembling orders from upper floors; also in industry for lowering bagged and packaged goods economically, and with minimum space requirements.

3-A-2. GRAVITY CONVEYORS— Rolling-Friction Type

Devices with rolling surfaces down which materials move over fixed routes by the force of gravity alone. There are three types:

a. Gravity Wheel Conveyors
b. Gravity Roller Conveyors
c. Flexible Gravity Conveyors
d. Gravity Roller Spiral Conveyors

3-A-2-a. ROLLING-FRICTION CONVEYORS—

Gravity Wheel Conveyors

Often called Skate Wheel Conveyors, gravity wheel conveyors employ two or more longitudinal frame members which support axles or shafts, each with one or more wheels.

The frame members may be straight or curved and are made of bar stock, angles or channels. The wheels may be set high, flush or low with reference to the frames. When the wheels are low-set, the frames act as guard rails.

Wheels are available in a variety of shapes, materials and diameters. Their spacing can be arranged to meet any condition, but at least three sets must always be under the smallest package to be handled.

Materials to be handled must have at least one smooth surface; although experience has shown that materials in tightly packed paper-wall bags can be conveyed provided the wheels are closely spaced and the line set at a steep pitch.

In general, the pitch necessary for free rolling is dependent on the size of the wheels, type of bearing, the contacting surface and the weight of the product conveyed. It will vary from 1½ to 7 pct for straight sections and possibly double that amount for curves and switches. The correct pitch frequently must be determined by actual test; especially with an untried product.

Y-switches, spur-curves and hinged sections add to the flexibility of their aplication. Packages move around curves with practically no drag because of the differential action of the outside and inside wheels.

Permanent installations usually are floor-mounted on stands, but they can be set up supported by wall brackets, or hung from the ceiling by hangers. Portable units are used with or without castered supports.

Unless very close wheel settings are used, these conveyors are less expensive than roller conveyors, but they are not usually constructed as sturdily and are, therefore, not used for such heavy duty as the latter. This does not apply, of course, to specially designed wheel conveyors.

APPLICATION—One of the most widely used types of conveyors for handling packaged goods. Short sections are carried on trucks to help the driver in unloading.

In many wholesale establishments lines of gravity wheel conveyors are set up with practically no pitch to serve as a means of pushing cartons with little effort in distributing and picking stock.

Short sections of wheel conveyor are sometimes used at the two ends of powered conveyors to facilitate feed and discharge.

3-A-2-b. ROLLING-FRICTION CONVEYORS—

Gravity Roller Conveyors

Conveyors employing two or more longitudinal frames which support shafts on which are mounted cylindrical rollers.

Frames may be bar stock, angles or channels. Rollers may be steel, aluminum, brass, cast iron, magnesium, plastic or maple. They can be set high, flush or low; the last require no guard rails. Types of bearings include plain, ball, grease-sealed, semi- and fully-enclosed.

Curves, spurs, Y-switches and hinged sections are optional. To provide needed differential action on curves, rollers are set radially. The radius of the curve at the center line of the conveyor must be greater than the length of the longest item to be conveyed. Curves are made with two types of rollers—tapered for use with flat-surfaced articles, and dual if two edges rest independently on the rollers.

To roll freely, packages must have one flat surface or their bottoms must have other elements, such as cleats, which will act as runners in the direction of motion. Three rollers must always be under the items conveyed.

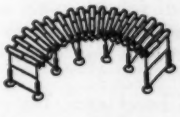
Compared with wheel conveyors, roller types have greater inertia due to the greater mass of rollers and must, therefore, be set at slightly increased pitch. When packages start rolling, successive units move with increased velocities.

Roller conveyors usually are more rugged and, except where wheels are very closely spaced, more expensive. Usually, they cannot handle bags, because these tend to sag between rollers more than with wheels.

Permanent installations may be floor-, wall- or ceiling-mounted. Portable sections are used with or without castered stands.

APPLICATION — Widely used for the same general purpose as gravity wheel conveyors but, generally, for heavier loads, and items which cannot be conveyed over the latter. If the nature of the product to be conveyed is such that neither gravity type can be used, a powered conveyor usually is available that can do the job.

3-A-2-c. ROLLING-FRICTION CONVEYORS— Flexible Gravity Conveyors



Frequently called Accordion Conveyors but often referred to as Extendable and Telescopic Gravity Conveyors because of the two kinds available.

Accordion conveyors have two pantograph-like frames composed of links with rollers mounted between their upper juncture points. When the conveyor is extended, the rollers are moved apart. When used to form a curved section, the ends of the rollers on the inside of the curve are higher than those on the outer edge.

Extendable conveyors, both wheel and roller, are made up of sections which telescope and are pulled apart to form a longer unit. Both kinds are portable.

APPLICATION—Both types are used to provide temporary extensions to conveyor lines, especially in such operations as loading and unloading cars and trucks.

The accordion type has the added advantage of being curvable. Its use is limited to relatively light loads and the amount it can be extended to the sizes of the packages, so that three rollers are always under them.

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3-A-2-d. ROLLING-FRICTION CONVEYORS

Gravity Roller

Spiral Conveyors

Like gravity spiral chutes, these conveyors are helical but, instead of friction blades, cylindrical rollers form the carrying surface.

Their advantages are that they allow the packages to ride slowly downward without damage. Practically any type of container can be handled. They possess the unique feature of permitting accumulation on the line, and no power cost is involved. They must, however, be carefully engineered for given conditions.

APPLICATION—In general their uses are the same as those of gravity chutes, but they can be employed to lower a greater variety of products.

3-B. POWERED CONVEYORS

Powered conveyors are means of moving materials over fixed horizontal, inclined and declined routes. The following are distinctive groups:

1. Belt
2. Cable
3. Chain
4. Portable
5. Pneumatic
6. Screw

3-B-1. POWERED CONVEYORS—Belt

Powered belt conveyors usually are made with a frame or rails, an endless belt, end rollers, a means of supporting the return portion of the belt, a tension take-up mechanism, and a driving element with motor, transmission and, optionally, a variable speed device.

The belt usually is made of fabric—plain woven cotton, impregnated or coated with material to meet operating conditions. Woven wire and sheet metal belts also are used.

Drive is usually from the head end. The return portion of the belt may be made to carry loads.

Except with certain wire belts, these conveyors must be straight units. Discharge is habitually over the head end because of difficulty in deflecting articles unless the surfaces are smooth.

Amount of incline is dependent upon the characteristics of the material being moved, and the surfaces and speed of the belt. Cleats at regularly spaced intervals improve the possible amount of incline, but complicate automatic feeding.

Fixed or adjustable supports are used for floor mounting; brackets on walls, and hangars from ceilings.

The following types are available:

a. Slide Bed
b. Roller Bed
c. Live Roller
d. Trough

3-B-1-a. BELT CONVEYORS—Slide Bed

This type of powered belt conveyor—often called Flat Bed or Slider Bed Conveyors—has a flat bed, metal or wood, over which the belt slides. The advantages of this construction are the smoothness of the carrying surface, quiet operation and relatively low initial investment and maintenance cost. However, to overcome the friction between the belt and the bed, considerable power is required and used, therefore, is restricted to comparatively light loads over short distances.

APPLICATION—Extensively used in many industries: Especially where glassware and similar fragile materials are handled; in light production and assembly lines to move articles from operator to operator; in floor-to-floor conveying; in sub-freezing areas where roller types give trouble.

Short sections often are used as "boosters" to restore elevation in gravity lines.

3-B-1-b. BELT CONVEYORS—Roller Bed

The essential difference between these conveyors and the powered slide-bed type is the use of rollers instead of a slide bed. They are more expensive than the latter, require more upkeep, and the riding surface is not as smooth nor the operation as quiet.

However, because of the roller feature, they are able to carry heavier loads over longer distances with lower power requirements.

APPLICATION—Their uses are generally for the same kinds of operations as the slide-bed types, but where heavier articles are to be conveyed over longer distances than feasible with the former.

3-B-1-c. BELT CONVEYORS—Live Roller

Powered conveyors employing an endless belt which runs under and drives rollers in contact with its upper surface.

The advantages of this arrangement are that the speed of the roller conveyor is controlled, articles can be moved up slight inclines, materials can be handled which would injure the surface of a regular belt, and packages can be stopped at any point and released when desired without stopping the conveyor itself.

However, live-roller conveyors are limited to straight-line operation.

APPLICATION—Used in packaging lines where it is desirable to have the feeding of the packages under the control of the operator without having to start and stop the machine.

3-B-1-d. BELT CONVEYORS—Trough

Powered belt conveyors made with either concaved slide or roller beds; the latter usually consisting of regularly spaced sets of three rollers, one horizontal and the other two slanting upward so that the belt is trough-shaped. Rubber coated cotton belting is generally used.

APPLICATION—Employed for handling bulk loose materials such as grains, chemicals, ores and coal; usually over long distances at moderate inclinations.

3-B-2. POWERED CONVEYORS—Cable Conveyors

Powered cable conveyors are those which employ a manila rope, or more usually a wire cable, to actuate a device which is in contact with and drags

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the material being handled. There are two general types:

a. Drags
b. Overhead Trolleys

3-B-2-a. CABLE CONVEYORS—Drags

Conveyors of this type employ a single cable or rope to which are attached regularly spaced scrapers composed of two semi-circular discs bolted together and fitted around and clamped to the cable. The scrapers ride in a U-shaped trough, through which they drag the material being handled.

APPLICATIONS—Used almost exclusively, and then extensively, for moving loose materials such as coal, crushed stone and ores over long distances. They are not suitable for handling materials which would be damaged by dragging over the bed of the trough.

3-B-2-b. CABLE CONVEYORS—Overhead Trolley Conveyors

These conveyors are described under Section 1—HAULAGE SYSTEMS. See 1-A-1-a. TRUCK DRAGGING SYSTEMS—Overhead Trolley Types.

APPLICATION—In addition to their use discussed in Section 1, they are employed to carry various kinds of containers and other devices for moving articles—such as trays for small parts or packages and hooks from which to hang such items as cartons in packing rooms.

3-B-3. POWERED CONVEYORS—Chain

Conveyors of this type employ one or more endless chains as the means of either themselves moving the material to be handled or to actuate various kinds of devices to move them.

There are many different kinds of chains, such as roller and flexible, and they may be used alone or with attachments like lugs, flat plates, and clamping devices to meet given requirements. Instead of end pulleys, sprockets or sheaves are employed.

Application—In general, chain conveyors are used for more rugged duty than belt conveyors. Different types are frequently combined to make up a system; which must be engineered if satisfactory results are to be secured.

Typical of the group are:

a. Apron
b. Drag
c. Flight
d. Live Roller
e. Pallet
f. Slat
g. Stabilized Tray
h. Vertical
i. Trolley
j. Special

3-B-3-a. CHAIN CONVEYORS—Apron

Apron conveyors are those employing two frames with continuous side rails in whose treads run two strands of endless roller chain between which are mounted metal aprons or pans locked, end-to-end, to form a continuous bed.

When pans are used in place of aprons, the system is referred to as a pan conveyor.

The aprons may be flat, but if the surfaces are concaved they can carry materials up steeper inclines.

APPLICATION—Used primarily for moving finely divided or lump bulk materials, especially if they are abrasive or hot, and which would damage belt conveyors. Perforated pans are used in the food processing industries, in metal manufacturing and in foundries for such processing operations as quenching metal parts, and handling heavy materials, such as scrap.

3-B-3-b. CHAIN CONVEYORS—Drag

Drag chains are conveyors which employ one or more endless chains to move materials over plane or troughed surfaces. There are two types:

1. Package
2. Bulk Materials

3-B-3-b-1. DRAG CHAIN CONVEYORS—Package

Packaged-type drag chain conveyors are relatively light, employing one or more endless chains which carry their burdens either on the chains themselves or on auxiliary devices attached to the chains, such as flat plates, or are fitted with lugs to help lift up inclines.

APPLICATION—Chain conveyors are extensively used in dairies, ice cream plants, bottling works and similar establishments to move milk cans and bottle cases.

Since they can operate around curves without auxiliary power, they are an economical means of moving cartons, pans and other containers.

Also used in bakeries and plants where hot products are to be moved. The almost universal use of flat-top drag conveyors in packaging lines indicates the field for which they are best adapted.

Flexible top chains run easily around horizontal idler discs, but curves are not possible with rectangular-top chains. With such chains, transfers must be made by deflecting the packages over dead plates.

3-B-3-b-2. DRAG CHAIN CONVEYORS—Bulk Materials

These conveyors employ a single endless chain which runs along the bottom of a trough, and with sufficiently large links to handle the material being moved. Discharge may be over the head end or at intermediate points through controlled openings in the bottom of the trough.

Speeds are relatively low to prevent undue wear, especially when abrasive materials are elevated or lowered.

APPLICATION—Although used primarily for moving loose, bulky materials, such as coal and ashes, they also are employed in the lumber industry for moving logs and sawdust, and in steel mills for transferring lengths of bar stock from cut-off machines.

3-B-3-c. CHAIN CONVEYORS—Flight

Conveyors of this type employ two or more endless chains to actuate devices which move the materials being handled. There are two distinctive types:

1. Push
2. Roller

3-B-3-c-1. FLIGHT CONVEYORS—Push Type

Strictly speaking, these are true flight conveyors because the pushing devices employed actually are vanes or flights. Both single and double chain arrangements are employed and, depending upon whether the flights scrape along or clear the bottom of the trough in which the flights are fitted, are called Scraper or Suspended Flight conveyors.

These conveyors are designed for handling particular materials or products, and usually do not operate at greater than 25 deg inclines.

APPLICATION—Originally designed for, and still extensively used in, moving finely divided or lumpy materials. But the flight principle has been applied, and successfully used, in smaller conveyors. There, they are used for elevating relatively tall articles with small bases, such as bottles and cans, as in filling orders for individual items stored in a basement, and which must be elevated to a higher level for assembling or distribution.

3-B-3-c-2. FLIGHT CONVEYOR—Roller Type

These conveyors employ two lines of endless chains between which are mounted cylindrical rollers which ride clear of the bed.

The materials, usually packaged goods, are carried forward by the advance of the rollers and not because of any rolling action. In fact, the rollers do not turn unless the packages are stopped; in which case, the rollers continue to advance under the restrained load, due to the fact that they are free to turn under the packages.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

APPLICATION—Widely used in such industries as food processing, bottling, pharmaceutical and chemical, where packaging is an important function; also in manufacturing plants for assembly-line work, where the ability to stop products on the line without having to shut down the system is an advantage.

3-B-3-d. CHAIN CONVEYORS—Live Roller

Live-roller conveyors employ two endless chains to turn cylindrical rollers mounted in a frame.

Two arrangements are employed. In one, sprockets are fitted to the ends of the roller shafts and are turned by the action of the endless roller chain.

In the other, two mitre gears are used at each end of a roller shaft. One gear is attached to the shaft and the other, which meshes with the first, is fitted with a sprocket and is driven by an endless roller chain; thus transmitting motion to the roller.

Power-driven curves are available. The drive is positive and slight inclines possible.

APPLICATION—These conveyors are used much the same as are belt-type live-roller conveyors but, primarily, for moving articles which are hot or which might otherwise damage a belt.

If packages are stopped on this type conveyor, the rollers will slide under them and, also, continue to rotate. If the package would be damaged by such action, a roller flight conveyor would overcome the difficulty.

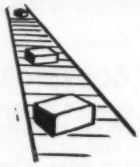
3-B-3-e. CHAIN CONVEYORS—Pallet

Other names for this type are Carry-All and Carousel.

Conveyors of this type employ one or more endless chains for moving load-carrying devices, called pallets, over fixed horizontal or inclined routes. Many different kinds of pallets are used with this system—flat surface, small dollies, and light four-wheel trucks are examples.

APPLICATION—Used widely in distribution and industry to move materials or articles of various shapes—as in terminals for handling package freight, and in foundries for moving moulds and castings. Their advantage is that their use is not limited to uniform loads.

3-B-3-f. CHAIN CONVEYORS—Slat



These are endless chain conveyors with dual chains, between which are mounted flat wood or metal pieces (called slats) of proper widths, lengths and spacing to meet given requirements.

They are ruggedly built to withstand impact and, because of their relatively smooth surface, can be fed and discharged at points other than their ends.

Cleats can be attached to improve possible elevations, but interfere with any type of automatic feeding.

APPLICATION—Used primarily for moving heavy, non-uniform loads, such as barrels, crates, and miscellaneous freight; especially where they must withstand severe impacts during loading.

3-B-3-g. CHAIN CONVEYORS—Stabilized Tray

Conveyors of this type are composed of frames which are built up of parallel rails, along which trays are moved and transferred by endless chains.

They are designed to run at slow speeds, dependent on the materials being handled and the process through which they are passing.

APPLICATION—Used in heat-treating, drying, baking and similar operations where materials must be exposed to some sort of controlled environment or treatment for considerable time.

The arrangement requires less floor space than would be needed if the trays were all in line.

3-B-3-h. CHAIN CONVEYORS—Vertical Types

The construction and action of conveyors of this type are discussed under Section 2—ELEVATING SYSTEMS. See 2-A-1—Vertical-Type Conveyors, which include the following:

1. Arm
2. Bucket
3. Push Bar
4. Suspended Carriage

APPLICATION—In addition to providing motion, all of these conveyors can be used inclined. In addition, the Tripping Buckets and Suspended Carriage conveyors may be used for horizontal handling.

The Elevating Platform conveyor is a special type of Arm conveyor, which shows how vertical machines can be adopted to motion in other planes.

3-B-3-i. CHAIN CONVEYORS—Trolley Types

The construction and uses of conveyors of this type are discussed under Section 1—HAULAGE SYSTEMS. See 1-A-1a and 1-A-1-b for

a. Overhead Trolley Types
b. In-Floor Type

APPLICATION—In addition to being used to drag industrial trailers, overhead chain trolley conveyors are employed to carry various devices, such as hooks and trays, for moving many different kinds of materials.

In-floor types are used in assembly-line work, and to assist in moving vehicles up and down ramps.

3-B-4. POWERED CONVEYORS—Portable

Conveyors which are portable models of standard types. Some of them are designed to be self-propelling.

Power may be gasoline or electric, according to the location where the machine is to be used. The following types are available:

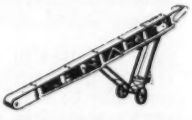
a. Apron
b. Belt
c. Bucket
d. Curvable
e. Extendable
f. Flight
g. Screw

3-B-4-a. POWERED PORTABLE CONVEYORS—Apron

See 3-B-3-a—APRON CONVEYORS for details of construction principles applied to these portable models.

APPLICATION—Same general purpose as the permanent types, but where mobility is an advantage.

3-B-4-b. POWERED PORTABLE CONVEYORS—Belt



See 3-B-1—POWERED BELT CONVEYORS for details of construction, which are incorporated in portable models.

APPLICATION—Widely used in many kinds of operations, especially in handling packaged goods in cartons and bags. Other applications include such operations as motor truck, freight car, and ship loading and unloading; stowing and breaking-out materials in storage areas.

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3-B-4-c. POWERED PORTABLE CONVEYORS—Bucket

Bucket conveyors which discharge over the end, as described in 2-A-1-b—VERTICAL-TYPE CONVEYORS—Bucket, are made in portable models.

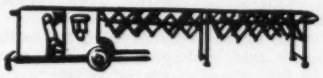
APPLICATION—Widely used for handling coal and similar bulky materials where a permanent installation is not required.

3-B-4-d. POWERED PORTABLE CONVEYORS—Curvable

Conveyors with wire-mesh belts, which are sufficiently flexible to permit their being made into curves.

APPLICATION—Used in situations where temporary conveyor lines are required, and it is necessary to have it curvable to pass around columns or through passageways. These machines have the distinct advantage of being driven throughout by a single motor.

3-B-4-e. POWERED PORTABLE CONVEYORS—Extendable



These powered belt conveyors have a pantograph, roller-type frame, and an arrangement at one end for taking up the belt and keeping it taut.

APPLICATION—Used in situations where it is desirable to have a powered belt conveyor which can be extended and is also portable.

3-B-4-f. POWERED PORTABLE CONVEYORS—Flight

See 3-B-3-c-1—POWERED FLIGHT CONVEYORS for details of construction used in portable models.

APPLICATION—Used for moving bulk materials. Also, for such items, as articles from production lines, where temporary elevation is required.

3-B-4-g. POWERED PORTABLE CONVEYORS—Screw

Twin-screw conveyors, of the type described below under 3-B-6—POWERED SCREW CONVEYORS, are made in portable models.

APPLICATION—Used primarily for moving bagged goods in car and ship unloading and loading operations, and in stowing and unpiling them in warehouses.

3-B-5. POWERED CONVEYORS—Pneumatic

Pneumatic conveyors are devices for moving materials through a tube by means of air pressure or vacuum.

In a pressure system, the air-compressing element is at the feed end; in the suction system, the vacuum-creating element is at the discharge end.

APPLICATION

Used for moving loose materials such as grain, flour, cotton, nuts, seeds and even coal. The only serious restrictions is that the material cannot be sticky or fragile.

The pressure system is used for longer conveying lines than the suction method. It usually is employed where distribution is made from a central point to a variety of outlets.

In addition to being used for handling bulk materials, both types are employed as moving carriers; exemplified by the pneumatic systems used in offices and plants for moving light articles.

3-B-6. POWERED CONVEYORS—Screw

Screw conveyors employ one or two continuous screws for moving materials.

The single-screw variety operates with the screw in a semi-circular trough. The material is advanced by being pushed through the trough by and along the blades of the screw.

The twin-screw type is differently constructed. It is composed of two tubes, usually flexible, around which are wound shallow metal spirals. The spiral on one tube is wound in the opposite direction to the other, and the tubes are driven; one clockwise and the other counter-clockwise. When some object, such as a bag, is placed on the conveyor it is moved forward by the advancing spirals.

APPLICATION

The single-screw variety is used for handling bulky loose materials. It also can be designed to move molasses, tar and other sticky materials.

The twin-screw variety usually is made in portable models for handling bagged goods in and out of carriers of all types, and for storage operations.

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4 Transferring Systems

Means of transferring materials from one location to another by intermittent-motion machines which carry their loads suspended, lift and lower them vertically, and move them through the air horizontally over either fixed routes or limited areas.

4-A. OVER FIXED ROUTES

There is but one system of handling where materials are transferred by being lifted and lowered vertically, then moved through the air suspended horizontally over fixed routes. It is known as the Monorail system.

4-A-1. Fixed Route Systems —Monorails

Monorails are systems of handling materials which comprise ceiling-mounted single rail trackage. This is used to support, and provide a fixed path of travel for, trolley-mounted hoists. They elevate and lower loads, and hold them suspended during horizontal travel.

The various types of hoists used with monorail trolleys are described in 2-B-3—INTERMITTENT-MOTION ELEVATORS—Hoists.

A large variety of "below the hook" devices—such as grabs, trays, work carriers and buckets—make this method of handling extremely flexible from the standpoint of the kinds of materials with which it can be used. But, because the loads must follow a fixed path—even though switches, turntables and similar accessories are included—it can not provide the same selectivity of pick-up and discharge points afforded by the limited-area systems.

The outstanding advantage of this method is overhead suspension coupled with relatively low installation and investment costs.

Monorails are engineered to a given job. There are two types, based on the means used to propel the trolleys along the rails;

a. Manually Propelled
b. Power Propelled

4-A-1-a. MONORAILS—Manually Propelled

The trolleys used with this type of monorail either are pushed or pulled along the track by the operator. The trolleys may be plain or geared. The latter is operated by a hand chain, which transmits the force applied by the operator to the chain through gears to the wheels of the trolley.

The hoisting component of the monorail either may be manual- or power-operated.

APPLICATION—Widely used for moving relatively light loads over short distances—as in passing articles through heat-treating oven, spray booths, and similar processes.

Also extensively used in the meat packing industry; in public cold storage plants for handling carcass meat in and out of refrigerated rooms, on and off elevators, along loading platform, and similar locations.

4-A-1-b. MONORAILS—Power Propelled

Power-propelled monorail systems can be arranged in several different ways—from simple motor-driven trolleys to elaborate machines, in which the operator rides in a cab called a telpher.

One type of trolley is moved by an electrically-driven rubber tire, which contacts and rides along the bottom side of the monorail track. Power is provided throughout the length of the system by bus bar or wire.

APPLICATION—Used for the same general purposes as the hand-propelled systems, but with the advantages of using power; the ability to handle heavier loads over longer distances.

4-B. TRANSFERRING SYSTEMS OVER LIMITED AREAS

Machines of this type are not restricted in their operation to horizontal travel of their loads through the air along fixed paths. They are able to position their hoisting element over any selected point and can, therefore, pick up and deposit materials anywhere within the operating limits of the machine.

There are two general types:
1. Derricks
2. Cranes

4-B-1. Limited-Area Systems —Derricks

Derricks are transferring machines comprising a slanting boom with lifting-lowering tackle at the free

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

end. The other end is attached to a mast which is not self-supporting but is held upright by stiff braces or by guy lines.

The boom may be fixed, in which case the derrick can be used only for elevating and lowering loads see 2-B-2—FIXED-ARM DERRICKS.

The types included in the present category are those whose booms can be moved in a vertical plane or swung horizontally, or both. With some arrangements horizontal swing may be as great as 360 deg., but in most constructions it is less.

Derricks may be equipped with hand-operated or powered winches or hoists. Three types are representative:

a. Stiff-Leg
b. Guy-Line
c. Miscellaneous

4-B-1-a. DERRICKS—Stiff-Leg

A derrick employing a slanting boom with hoisting tackle attached to a vertical mast, which is held rigidly upright by two or more members called stiff legs.

The usual construction is to have the mast positioned at the junction point of bottom sills, from the ends of which the braces slant in toward the mast. The angle between the sills may be fixed or variable from 60 to 90 deg, and determines the swing of the boom. Portable models are available.

APPLICATION—Used in construction and marine operations where full swing of the boom is not required. This type also is mounted on trucks.

4-B-1-b. DERRICKS—Guy Line

A type of derrick which has a slanting boom and a mast held in a vertical position by means of guy lines.

If the boom is sufficiently short to pass under the guy lines, 360 deg traverse of the boom is possible; otherwise, the swing of the boom is limited by the locations of the guy lines.

APPLICATION—same general purpose out-door work as the stiff-leg type, and where full-swing is desirable.

4-B-1-c. DERRICKS—Miscellaneous Types

There are a number of different kinds of derricks which closely resemble each other but differ silghtly in construction.

A Pole Derrick has a combined mast and boom. The pole is guyed, usually at a slant.

A Shear-Leg Derrick has two members which act as both mast and boom. They are spread wide at the base and slant toward each other at the top. Between the lower ends is a winch.

An A-Frame Derrick also has a shear-leg mast with a cross member toward the bottom. In addition it has a boom which is hinged to the cross-member. This derrick can be moved forward and backward, and the boom can swing through 180 deg.

A Tripod Derrick consists of three members which join at an apex, from which the hoisting component—usually a block-and-tackle or hand chain hoist, is attached. This latter type affords vertical motion only.

APPLICATION—All these derricks are used in outdoor operations—yards, marine terminals and vessels. Some are mounted on trucks.

A shear-leg derrick mounted on a truck, and called a gin truck, is used extensively in handling line pipe in and out of gondola cars, and in yard storage operations.

4-B-2. Limited-Area Systems —Cranes

Cranes which employ a mast and a boom differ from derricks, in that the mast is not held in an upright position by stiff-leg braces or guy lines but is self-supporting, or otherwise held vertical.

Cranes of the different types resemble each other in appearance less than some of them resemble derricks. The following are typical:

a. Jib
b. Bridge
c. Portal
d. Power

4-B-2-a. CRANES—Jib

A jib crane is one employing an horizontal arm or jib pivoted to a vertical support. It is guyed from its outer end or braced from underneath. The arm carries either a fixed or trolley-mounted hoisting mechanism.

Jib cranes are made in the following types:

1. Wall Bracket
2. Column
3. Pillar
4. Portable

4-B-2-a-1. JIB CRANES—Wall Bracket

A jib crane which is pivoted so that it can swing through 180 deg. The hoisting component is either fixed at the end of the arm or is trolley-mounted, so it can operate at any point over which the arm can swing.

APPLICATION—Widely used in machine shops and maintenance departments to move machines or parts from one location to another. Can be swung aside when not in use.

A variation of the basic type is a walltraveling crane. The crane is mounted to an upright frame, which rides on two tracks—one set above the other—along the wall. This gives greater flexibility than when the crane is mounted in a fixed location.

4-B-2-a-2. JIB CRANES—Column

This is a type of jib crane mounted on a column which is pivoted top and bottom, so that it can swing through 360 deg. It also is known as a Jib Cantilever crane.

APPLICATION—For the same general purposes as a wall-bracket crane, where full swing is desirable.

4-B-2-a-3. JIB CRANES—Pillar

A type of jib crane in which the horizontal arm is attached to a self-supporting pillar, which can be rotated through a full swing. A variation is to have the arm pivoted at the base of the pillar.

The power to rotate the pillar may be manual or electrical.

APPLICATION—Used largely in outdoor services—such as railroad repair and ship yards—for unloading and loading various kinds of materials.

Particularly useful where full swing is required, and there is no means of pivoting the mast to an overhead structure.

4-B-2-a-4. JIB CRANES—Portable

See 2-B-1-b—FIXED-ARM CRANES—FLOOR CRANES. These cranes, often called Floor Cranes or Shop Cranes, are available with swinging arms, which place them in this category.

4-B-2-b. CRANES—Bridge

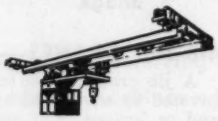
Cranes employing a characteristic bridge, consisting of one or more girders on the top or bottom of which operate one or more trolleys.

The manner in which the bridge is supported determines the particular type of bridge crane as:

1. Overhead Traveling
2. Gantry

4-B-2-b-1. BRIDGE CRANES

Overhead Traveling



A bridge crane employing, on the top or the bottom of each extremity of the bridge, one or more trolleys which travel on two parallel, overhead tracks or runways. The hoisting mechanism moves back and forth along the bridge, while the bridge travels along the parallel tracks.

It is possible, therefore, to locate the hoist over any point within the limits of the runways.

Bridge cranes can be made in a wide variety of capacities from a few to several hundred tons, and with both travel and hoisting speeds to fit given requirements. They may be hand-operated—push or hand chain-and-rack operated—or may have one, two or three motors, depending upon which of the components are powered. Selection can be made from different kinds of controls, including cab.

Construction details are not covered here, because they must be engineered to the work to be done.

APPLICATION—An extensively used type of handling equipment, particularly in the steel industry. There the cranes are employed in transferring all kinds of raw materials, work in process, and finished goods; not only in the mills proper but, also, in storage areas.

4-B-2-b-2. BRIDGE CRANES—Gantry

Gantry-type bridge cranes differ from the overhead-traveling type by the relative positions of the bridge and the supporting runways.

A full-gantry crane is one with the runways or tracks on the ground, and the bridge is carried high in the air on tall trestles.

In the *semi-gantry crane*, one support for the bridge is a high trestle, as described above; the other is a runway just under the bridge and supported by hangers or brackets on the outside of a building.

All these cranes require less investment than the overhead-traveling type, and can be more easily changed should alterations be required.

APPLICATION—Used particularly in conection with freight car, ship, bulk handling, and similar handling jobs carried on outdoors, alongside buildings, on terminals, and in storage yards.

4-B-2-c. CRANES—Portal

These cranes are supported, as are full-gantry cranes, by tall trestles. But instead of a bridge at the top, portal cranes have a full revolving boom-type crane. The boom usually is arranged so it can be raised and lowered in a vertical plane, so that ships can be loaded and unloaded by luffing.

APPLICATION—Used almost exclusively for shipside loading and unloading operations.

4-B-2-d. CRANES—Power

Power cranes are those which are mounted on some type of self-propelled vehicle—automotive or locomotive.

The first type are called Automotive Power Cranes; the second, Locomotive Power Cranes.

4-B-2-d-1. AUTOMOTIVE POWER CRANES

Often called Mobile Cranes or Yard Cranes, they are of the boom-type and, for the most part, full revolving. There are some models with rigid and swivel-type booms; the former with no swing, the latter with about 280 deg traverse.

APPLICATION — The hoisting function is but one which these versatile machines can perform. Their range of application can be extended simply by changing the front-end operating equipment to a shovel, clamshell, dragline, hoe, or pile driver.

Based on the type of mounting, automotive power cranes are classified as:

a. Crawler Mounting
b. Truck Mounting
c. Wheel Mounting

4-B-2-d-1-a. AUTOMOTIVE POWER CRANES—Crawler Mounting

The mounting of these cranes consists of two continuous crawler belts made up of tread shoes or links, and driven by the same superstructure engine as operates the boom.

Travel speeds range from ½ to 2 miles per hour.

APPLICATION—Used over relatively short distances where soft-ground conditions would prevent use of other types of mountings.

4-B-2-d-1-b. AUTOMOTIVE POWER CRANES

Truck Mounting

The mounting in this case is a rubber-tired vehicle which is propelled by a different engine than the one used to operate the crane.

Truck mountings may be supported by two or three axles, and the method of driving may be by chains or gear-driven axles. Many different types of cranes are so mounted.

APPLICATION—Used primarily for lighter work than either of the other two types of machines in this general category, especially where mobility is important. They cannot, of course, operate over as bad terrain conditions as the crawler type.

4-B-2-d-1-c. AUTOMOTIVE POWER CRANES

Wheel Mounting

This type of crane is carried on a rubber-tired vehicle which is propelled by the same engine as that which operates the crane. The slanting boom, full swing type of crane usually is mounted on this rather than on a truck mounting.

APPLICATION—Widely used in yard operations, especially where there is firm ground and speed is a factor. This type usually is specified for heavy-duty lifting; while the truck mounted cranes are used for lighter, often emergency work.

4-B-2-d-2. LOCOMOTIVE POWER CRANES

Cranes mounted on powered cars for operation on railroad tracks.

APPLICATION—For heavy crane operations in yards where they are frequently used with industrial railway equipment. Standard gauge cranes of this type are used in railroad construction and maintenance work.

In plants, this type of equipment now is being displaced, in many instances, by the more mobile power cranes.

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5 Self-Loading Systems

Means of handling materials by intermittent motion with mobile machines which are self-loading—that is, they can pick up, move horizontally, set down and, in some instances, tier their loads without the need of manual or other external handling. They also are known as Unit-Load systems.

Unit loads may be composed of individual items handled without breaking bulk, as though they were a unit, or of items which are held together by strapping, gluing or other physical means.

Classified according to the kind of load carrier employed, there are two basic systems. But there are other methods, including a modern trend toward the elimination of load carriers, which do not fall in either category, so we have:

A. Skid Systems
B. Pallet Systems
C. Other Unit-Load Systems

5-A. SKID SYSTEMS

Self-loading systems of handling in which unit loads are carried on skids. The low-lift-platform-skid method was the first true unit-load system devised.

Skid handling frequently is coordinated and integrated with other systems; even with the fork-lift-truck-pallet method, because skids also can be handled by Fork-equipped machines.

The kinds of equipment utilized in these systems are:

1. Skids
2. Skid Jacks
3. Low-Lift Platform Trucks
4. High-Lift Platform Trucks

APPLICATION

Extensively used for handling loads which do not remain in storage for long periods, as in certain types of wholesale warehousing, also in locations with low headroom where multiple tiering is not practical.

Still widely used in its first important application—handling flat sheets of paper and cardboard on relatively cheap skids, used as one-way shippers in common carriers.

Although used for multiple tiering, skids are so constructed that their use for this purpose is more restricted than that of pallets.

5-A-1. Skid Systems—Skids

Skids are load-carrying platforms of wood, metal, or both, supported in various way to give sufficient underclearance to admit platform-type handling equipment.

Most skids are characteristically longer in the direction of travel than they are wide.

All of the following types of skids can be handled by lift-platform trucks, but the first two also are handled by special kinds of equipment described under Skid Jacks below.

a. Live Skids
b. Semi-Live Skids
c. Dead Skids

5-A-1-a. LIVE SKIDS

Live skids are dolly-like carriers employing live running gear, such as wheels or casters, and so designed that they can be handled by lift-platform trucks. They can be moved horizontally without the use of a machine.

Their supports are the most expensive of any type of skid.

APPLICATION—Because of their relatively high initial cost, their use is limited to handling very rapid-turnover merchandise, or to situations where maneuverability of the unit load in somewhat restricted areas is an important factor.

They are used in order—picking where they can be moved about manually, then carried by powered skid-handling equipment. They are seldom used for multiple-tiering.

5-A-1-b. SEMI-LIVE SKIDS

As supports, semi-live skids employ two fixed rear rear wheels and two rigid front wheels.

To make such a skid mobile, the front legs must be lifted clear of the floor. Special devices are used for this purpose—see 5-A-2—SKID JACKS, below.

Semi-live skids are difficult to maneuver in reverse, and are not as stable as those with four-point support. Standard underclearance is 9½ in.; platform widths are 20, 30 and 36 in.; lengths 36, 48, 54, 60 and 72 in.

APPLICATION—Manually powered semi-live skids provide a relatively inexpensive handling method—low

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initial investment and practically no maintenance cost. One jack services several skids.

This method is used largely by wholesalers and manufacturers where storage periods are short and maneuverability is important.

Sometimes used to handle palletized loads in order to take advantage of the larger wheels for manual handling.

5-A-1-c. DEAD SKIDS

Dead skids are platforms of wood, metal, or both, supported by two rigid lengthwise runners, or four fixed corner legs, and with sufficient underclearance to admit the platform of a low- or high-lift truck.

Cheaply constructed skids are made of low-grade lumber to serve as one-way shippers. The type usually employed in active skid operations is sturdily built with a solid platform of wood, bound by a metal frame and supported by metal legs.

There also are all-metal skids, and those with various kinds of superstructures, as stakes, bins, shelves, and with front and side dumping arrangements.

APPLICATON—Many varieties of dead and special superstructure skids are made as stock items. If one cannot be found to fit a given situation, there are manufacturers who will make them to order.

5-A-2. Skid Jacks

Low-lift devices designed to raise the front end of semi-live skids, and to provide running gear under the front end for horizontal motion. There are two types:

a. Hand Skid Jacks b. Powered Skid Tractors

5-A-2-a. HAND SKID JACKS

A manually propelled device used to elevate the front end of a semi-live skid. It employs one or two closely-spaced wheels and an elevating-steering handle, which acts as one end of a lever with the fulcrum at the wheel axle. At the other end, there is a means of engaging the skid at the center of the front edge.

When the handle is pushed downward, the skid is raised sufficiently to clear its fixed legs from the floor. The jack provides the means of moving and steering the skid.

It is important, from a safety standpoint, to select a skid jack so designed that it locks in place when the skid is elevated, and so that it will not snap out until the operator is ready to spot the skid in place.

APPLICATION—See 5-A-1-b—SEMI-LIVE SKIDS.

5-A-2-b. POWERED SKID TRACTORS

Small four-wheel industrial tractors with a special hydraulically actuated lift arm; which engages the front edge of a semi-live skid, elevates it and moves it horizontally. Battery-powered, operator-lead types are available.

APPLICATION—Used for handling heavier loads over longer routes than are practical with hand equipment. Can also be used with live skids, provided the rear wheels are fixed.

5-A-3. Skid Systems —Low-Lift Platform Trucks

Self-loading trucks, of the platform type, whose lifting mechanism is designed to raise the load sufficiently for horizontal movement.

Most trucks of this type have a lowered platform height of between 6 and 11 in., and a 3- or 4-in. lift. There are three basic types:

a. Hand Trucks
b. Powered Hand Trucks
c. Powered Low-Lift Platform Trucks

5-A-3-a. LOW-LIFT PLATFORM HAND TRUCKS

A low-lift platform truck consisting of a chassis mounted on two fixed rear wheels, and with one or two closely-spaced wheels at the front end controlled by a handle for pulling and steering. These trucks often are referred to as Lift Trucks and Skid Trucks.

A platform, which may be either solid sheet metal or an angle frame, carried on the chassis to which it is connected by a linkage mechanism.

The means employed for actuating the lifting linkage mechanism—and, hence, for elevating the platform—determines the type as:

1. Mechanical Lift
2. Hydraulic Lift

5-A-3-a-1. LOW-LIFT PLATFORM HAND TRUCKS —Mechanical Lift

The elevating mechanism of these trucks is actuated by exerting downward pressure on the pull handle. Single-stroke and multi-stroke lifting types are available.

In single-stroke machines, full lift is obtained by one downward sweep of the handle. In multi-stroke models, the handle must be "pumped" from four to 12 times to secure full lift.

Single stroke machines are less expensive than multi-stroke types, and are quicker acting, but they require more clear operating space to function. Some models cannot be operated unless the handle is almost directly in line with the machine's longitudinal axis. Others are made to function anywhere within a 300-deg arc.

APPLICATION—For one-man operations, these trucks usually are limited to 2500-lb loads and 150-ft hauls. They are useful in loading-dock operations, where the beds of vehicles and the height of the docks are at approximately the same level.

Also used as emergency standby eqquipment where operations have been mechanized.

5-A-3-a-2. LOW-LIFT PLATFORM HAND TRUCKS —Hydraulic Lift

Elevation of the platform in these trucks is accomplished by exerting pressure on oil in a cylinder, and through it, to a ram which actuates the lifting mechanism. There are hand-operated and foot-lift types.

In hand-operated machines, the pressure is exerted either by pumping the pull handle up and down or by means of a hand lever. In foot-lift models, the operator works a foot pedal.

APPLICATION—Hydraulic-lift trucks elevate heavier loads more easily than mechanical models. Their general action permits smoother control.

However. any machine which is manipulated by either hand- or foot-pumping is fatiguing if the handling cycle is short and highly repetitive.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

5-A-3-b. POWERED LOW-LIFT PLATFORM HAND TRUCKS

Often called Low-lift Platform Walkies, these trucks were developed by motorizing the traction and, later, the elevation of low-lift platform hand trucks. Their distinctive feature is the front end, where there is a small battery, one or two closely-spaced drive wheels, and a steering handle.

Manufacturers have strived to make these machines shorter and shorter. They now have brought them down to within a two-ft length without the load.

Because the early models were operator-led, they were called "walkies." Now that models have been developed on which the operator rides, the two types are best designated as:

1. Non-Ride Types
2. Ride Types

APPLICATION — Widely used where operations are mechanized for handling loads horizontally; especially in loading and unloading common carriers and, in storage operations.

5-A-3-b-1. POWERED LOW-LIFT PLATFORM HAND TRUCKS— Non-Ride Types

The distinctive features of hydraulically elevated low-lift platform hand trucks have been retained in these machines. There are models with pedal lifts, but most trucks now have motorized elevation and traction.

Capacities range from 2,000 to 10,000 lbs in standard models, 4,000 lbs being average. Speeds are from 3 to 3½ miles per hour—about that of a brisk walk.

APPLICATION—Particularly useful in loading and unloading trucks and freight cars, elevators in multi-storied operations, and for short movements of heavy loads up and down production aisles.

Freqquently used to spot load in areas where high-lift machines are putting away.

5-A-3-b-2. POWERED LOW-LIFT PLATFORM HAND TRUCKS—Ride Type

Before powered hand machines were designed specifically to permit the operator to ride, he frequently operated his machine sitting on the battery box and steered with the handle which was in a vertical position.

Some present models have been developed merely by strengthening the top of the battery compartment, and improving the foot platform for greater safety and comfort. Others have been designed so that the operator stands and controls the machine in that position.

Electric, gasoline and gas-electric models are offered in practically the same capacities as non-ride types, but with slightly greater speed.

APPLICATION—These machines have greatly extended the range of low-lift skid machines, but their use is restricted to operations over well-paved surfaces and, usually, to protected runways.

5-A-3-c. POWERED LOW-LIFT PLATFORM TRUCK

These are self-loading "stand up" type trucks with a low-lifting platform. The undercarriage consists of two or four load-bearing and steering wheels, often called trail wheels and usually about 10 in. in diameter, and two drive-steer wheels under the power unit. The latter are set apart the full width of the machine, and usually are about 20 in. in diameter.

These machines are made so that the operator stands on a platform and faces the controls, power unit, and load during horizontal travel.

Capacities range from 2,000 to 10,000 lbs; speeds vary between four and five miles per hour. Gasoline, electric, and gas-electric types are available.

These trucks provided the first true self-loading system of horizontal handling. From them were evolved the high-lift platform machines. Some manufacturers use the same basic construction for both types of machines, except for the degree of platform elevation.

APPLICATION—Since these machines have higher capacity batteries, and are generally more ruggedly constructed, they are used for more severe service than powered low-lift platform hand trucks.

Their longer lengths (about 40 per cent with a 48 in. load) means that they require more turning space than the powered hand models.

5-A-4. High-Lift Platform Trucks

Platform trucks of the self-loading type which not only can pick up, transport, and set down their loads, but also can tier them without breaking bulk.

There are three types:

a. Hand Stackers
b. Powered Stackers
c. Powered High-Lift Platform Trucks

5-A-4-a HIGH-LIFT PLATFORM TRUCKS— Hand Stackers

This group of trucks frequently are referred to as Portable Elevators, Tiering Machines. Construction details of these machines are given in 2-B-5—INTERMITTENT-MOTION ELEVATORS—Stackers.

All these trucks are manually propelled, but the elevating mechanisms may be mechanically or electrically operated.

The original method of supplying current to the motor was by plugging into the building's line current. More recently, very light-duty stackers—500- to 2000-lbs capacity—have been introduced which have an automotive-type, 6-volt battery.

APPLICATION—Hand-propelled stackers are used for light loads and short distances.. Essentially, they are tiering machines, and any horizontal moves usually are made by other types of equipment. They are still widely used for stacking bin-skids in storage racks.

5-A-4-b. POWERED HIGH-LIFT PLATFORM TRUCKS—Powered Stackers

Non-counterbalanced, high-lift platform trucks developed by motorizing the traction and elevating elements of hand stackers.

In addition to the conventional masts (rigid or telescopic), carriage, and platform, these models have the characteristic front ends of walkie-type machines—the battery, elevating and driving mechanism, and the lead-steer handle. Most models have stabilizing casters under the corners of the uprights.

A variation in the conventional platform type is a model with arms which can be rolled under a skid, or even under a single-faced pallet, provided there is sufficient clearance. In these arms are nested forks, which are raised to provide elevation. There now are two types of the original so-called "walkies:"

1. Non-Ride Types
2. Ride Types

APPLICATION—These machines are used in locations where short turning radii are important—especially in tiering at 90 deg—because they require less aisle space for this purpose than other types of high-lift platform trucks.

5-A-4-b-1. POWERED STACKERS—Non-Ride Types

These trucks also are referred to as High-Lift Walkies, Platform Type. Like their low-lift counterparts, they have the traction—and, frequently, the elevating controls as well—in the handle.

Safety features such as brakes, "deadman" cut-offs, limit switches, etc., are provided.

APPLICATION—Used for relatively short hauls—approximately 150 ft, 200 being tops.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

5-A-4-b-2. POWERED STACKERS—Ride Types

In changing powered stackers from the non-riding to the riding type, manufacturers have retained the characteristic features of the original models—notably their wheelbase.

APPLICATION—By relieving the operator of walking, these machines are applicable to longer hauls than practical with operator-led types.

5-A-4-c. POWERED-HIGH LIFT PLATFORM TRUCKS

Except for the degree of lift, these trucks are constructed like their low-lift counterparts. They are more ruggedly built, and are considerably longer than comparable powered stackers.

It was not long after these machines were introduced, and the advantages of stacking unit loads demonstrated, that the high-lift fork truck was developed.

APPLICATION—Used for heavier duty service, and over less even running surfaces, than powered stackers. Frequently employed in mills and foundries, where loads must be lifted and dumped; but under conditions where the supporting members of the truck under the platform will not interfere with a successful operation.

5-B. PALLET SYSTEMS

Self-loading systems of handling, in which the unit loads are carried on pallets. The machines used have characteristic forks, so the systems are generally called fork-lift-truck-pallet systems. They frequently are integrated with other systems.

The kinds of equipment utilized include:

1. Pallets
2. Low-Lift Fork Trucks
3. High-Lift Fork Trucks

APPLICATION:

These systems literally have revolutionized handling and, more particularly, storing methods by making it possible to multiple-tier many kinds of materials which cannot be stacked successfully as load-supporting units on skids. Their influence has been felt in all phases of plant layout, and they can be credited for the increasing adoption of unistoried manufacturing and storage structures.

An example of integration with other systems is the use of stevedore pallets for slinging unit loads over ship side by the ship's gear. It would be easier to list industries in which palletized loads are not being handled today, than those which move their materials on these carriers with fork equipment.

5-B-1. Pallets

Pallets are load carriers consisting of one or two platforms made of wood, metal, or both, and designed to be handled by fork-lift equipment.

Usually, they have three stringers which, with single-platform pallets, act as supports and, with double-platform pallets, as separators between the two platforms. Compared with skids, pallets are lower—usually about 6 in. overall—with 4-in. vertical openings to admit the forks.

Pallet dimensions are designated by giving, first, their length; the dimension in the direction of the handling forks. In pallets with stringers, this is the stringer-length. Second, the width; which is the length of the top deck boards of wood pallets, or the length in the direction across the forks in other pallets.

Pallets may be classified according to characteristics shown below.

a. Materials of Construction:
   1. All-wood.
   2. Wood, metal-bound.
   3. All-metal—steel, aluminum or magnesium.
   4. Wire mesh

b. Fastenings:
   1. Nailed with cement-coated, drive screw, annular, clinch- or other type of nail.
   2. Bolted.

c. Number of Faces (Platforms or Decks):
   1. Single-faced; consisting of but one platform supported by runners (stringers)—usually three.
   2. Double-faced; consisting of two platforms, separated by stringers—usually three.

   If the pallet is to be used with low-lift fork equipment, sufficiently wide spaces must be left in the bottom decking to permit the load wheels to drop through and make contact with the ground. Correct spacing is 6-8 in., with single load wheels; 8-10 in., with tandem wheels.

d. Reversibility:
   1. Reversible; double-faced pallets with the same deck-board arrangement top and bottom.
   2. Non-reversible; with different deck-board arrangements top and bottom.

e. Stringer Positions:
   1. Flush type; pallets in which the outside stringers are flush with the ends of the deck boards.
   2. Wing type; those in which the stringers are set inboard from the ends of the deck boards.

   Full-wing types have both top and bottom deck boards overhanging. Semi-wing type have the top deck boards overhanging, the bottom boards flush with the stringers.

   The former also are called stevedore or cargo pallets and are extensively used in shipside operations. The latter frequently are used to accommodate the outriggers of stacker-type high-lift machines.

f. Number of Entries:
   1. Two-way entry; if the forks can enter the pallet from two opposite sides only.
   2. Four-way entry; if the forks can enter the pallet from all four sides. Blocks or posts are used as separaters, instead of stringers.
   3. Eight-way entry; if the forks can enter the pallet from all four sides and the four corners as well.

g. Special Types:
   1. Pallets with special superstructures—such as bins, racks, and shelves—to serve a particular purpose.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

h. Expendability:

1. Non-expendable; pallets so constructed that they are expected to be re-used many times.
2. Expendable; those constructed of light wood, plywood, fibreboard, or other light material. They are intended to serve for a short period; as, for example, a one-way shipper.

5-B-2. Pallet Systems -Low-Lift Fork Trucks

Low-lift, self-loading trucks designed to handle pallets for horizontal movements. Their principal design features consist of two elevating arms or forks, which serve the rear portion of the frame and which carry load wheels near their extremities so hinged that they can be swung up and down by means of an hydraulic elevating mechanism.

The forks are approximately 3 in. thick and, with their load wheels drawn up, can enter the vertical opening of a double-faced pallet. When the forks are fully positioned in the pallet, the load wheels are swung downward, pass through the open space in the bottom deck of the pallet and make contact with the floor. As the hydraulic mechanism continues to swing them downward, they start to lift the pallet.

Load wheels are about 3¼ in. in diameter, and may be mounted singly or in tandem; the latter arrangement being an advantage when running over rough floors and bridging the gaps between elevator cars and shaftway sills.

Fork arms are optionally 6 or 9 in. wide. Their lowered height is 3½ in., with a 4 in. lift.

Hydraulic elevating mechanisms only are used in these trucks, which include:

a. Hand Type
b. Powered Hand Types

5-B-2-a. LOW-LIFT FORK TRUCKS—Hand Types

This equipment often is referred to as Pallet Hand trucks, or Pallet Lift Trucks. More accurately, they are low-lift fork trucks, manually propelled.

Characteristic features include single or closely spaced dual steering wheels at the front end and a pull-steer handle. The hydraulic lift may be pump-handle, hand-lever or foot-pedal actuated. Capacities range from 2000 to 6000 lbs.

APPLICATION—The small diameters of the load wheels limit the weight which can be handled by one man to about 1500 lbs, and the distance to within 100 ft.

They are useful for shifting piles of empty pallets, and pallets with light loads, in and out of carriers—provided there is only a slight ramp pitch involved—on and off elevators, and as standby equipment where operations are mechanized.

5-B-2-b. LOW-LIFT FORK TRUCK—Powered Hand Types

Low-lift fork hand trucks whose design has been modified so that they are power driven. Foot-pedal and power-elevated models are available.

The front drive wheel, or wheels, are rubber tired to provide better traction. Rear wheels may be steel or composition.

There are electric, gasoline and gas-electric models. The two basic types are:

1. Non-Ride Types
2. RideTypes

5-B-2-b-1. POWERED HAND TRUCKS—Non-Ride Types

Popularly referred to as Walkie Pallet Trucks or Motorized Pallet Trucks. They are self-loading trucks with all the characteristics of low-lift fork hand trucks—single or closely spaced dual front wheels, and a steer handle which carries the traction and, usually, the elevating controls.

Capacities range from 4000 to 6000-lbs, and speeds from 2½ to 3 miles per hour. Elevating time is about 3 seconds. Very short models, less than 2 ft longer than the load, have been developed.

APPLICATION—These machines have greatly extended the usefulness of low-lift fork equipment by making it possible for one man to lift the load without fatigue, and to move considerably heavier unit loads than he can handle with manually propelled equipment.

Particularly useful in multi-storied operations, and where there are structural ramps up which loads must be moved, or where dock boards are not level.

5-B-2-b-2. POWERED HAND TRUCKS—Ride Types

Without any basic change in design, low-lift, fork, powered hand trucks of the "walkie" type are altered slightly so that the operator can ride sitting on the battery box, and steering with the lead-handle held almost vertically.

There also are models which have been designed specifically for the operator to ride. In some of these, he sits; in others, he stands while manipulating the machine.

APPLICATION—In addition to being able to handle loads of 6000 lbs, an operator now can move them over considerably longer distances than with machines which require him to walk.

Their high maneuverability and relative shortness make them useful in handling palletized loads over long platforms and in congested aisles. Their light weight and relatively low cost make them ideal feeders to more expensive high-lift equipment, which then can be kept actively engaged in tiering operations.

5-B-3. High-Lift Fork Trucks

Self-loading trucks equipped with forks to handle unit loads on pallets, whose elevating mechanism permits sufficient lift for multiple-tiering of such loads.

There are four basic types:

a. Hand Stackers
b. Powered Hand Stackers
c. Counterbalanced Powered Hand Stackers
d. Cantilever Fork Lift Trucks

5-B-3-a. HIGH-LIFT FORK TRUCKS—Hand Stackers

These high-lift fork trucks also are known as Pallet Stackers, Tiering Machines. Construction details of these machines are given in Section 2-B-5—INTERMITTENT-MOTION ELEVATORS—Stackers.

Instead of a platform, the type used to elevate pallets has forks. All are manually propelled, but the elevating mechanisms may be mechanically or electrically operated.

The original method of supplying current to the motor was by plugging into the building line current. More recently, very light-duty stackers—500- to 2000-lbs capacity—have been introduced which have an automotive-type, 6-volt battery.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

APPLICATION—Hand propelled stackers are used for light loads and short distances. Essentially, they are tiering machines, and any horizontal moves usually are made by other types of equipment.

5-B-3-b. HIGH-LIFT FORK TRUCKS —Powered Hand Stackers

These trucks also are known by several other names—Straddle Trucks, Outrigger Trucks, High-Lift Walkies. They are self-loading high-lift fork trucks which were evolved from the hand stacker by slightly changing the design, motorizing the machine, and substituting lift forks for a lift platform.

The outstanding characteristic of these trucks is the rigid frame composed of two arms, called outriggers or straddles, in which are mounted small load wheels. The arms remain in contact with the ground through these wheels even when the load is elevated by the forks, which are carried between the outriggers. This construction obviates the necessity of having to compensate for the weight of the suspended load by counterbalancing.

Models designed for use with double faced-pallets have the arms so spaced that they straddle the outside stringers of flush-type pallets, or run under the overhanging upper deck of semi-wing type pallets.

Models to be used with single-faced pallets have the arms set inboard so they can run under the pallet itself. The load wheels in this latter kind of trucks usually are larger in diameter than those used with the straddle type. There is very little underclearance between the arms and the floor, so that even slight ramps offer operating difficulties.

Capacities are between 2000 and 4000 lbs with loads up to 48 in. long. Lifting speeds have been slow—12 ft per min—but have been improved in recent models.

Rigid and telescopic, but not tilting masts, are offered, and the standard fork lift height is 120 in. There are two types:

1. Non-Ride Types
2. Ride Types

5-B-3-b-1. NON-COUNTERBALANCED POWERED STACKERS—

Non-Ride Type

Pallet-Stacking, Non-Riding Straddle Trucks, High-Lift Walkies are other names applied to these powered stackers.

They are equipped with a steering handle in which the traction, and usually the elevating controls, are carried. The front ends of these machines are characteristically short; almost all current models being less than 3 ft longer than the load. This means they can be operated in very restricted areas.

Storage batteries are the only source of power presently used. Running speeds are between 2½ and 3 miles per hour. These machines weigh, without their batteries, approximately 2,000 lbs.

APPLICATION—Widely used in warehousing and especially in old multi-story buildings. Their light weight and ability to pile from narrow aisles make it possible to mechanize operations where limited capacity floor loads and elevators would prevent the use of more conventional equipment.

Their activity usually is limited to short runs; long hauling being done by low-lift equipment or by ride types.

5-B-3-b-2. POWERED HAND STACKERS —Ride Type

Known also as Pallet-Stacking Riding Trucks, these high-lift stacker-type trucks are so arranged that the operator can sit on the battery box and steer the machine by the handle. Another arrangement is such that he stands facing the load with the controls in front of him.

Speeds are slightly greater than with the operator-lead models. The distinctive shortness of these machines is their greatest operating asset.

APPLICATION — These machines have greatly increased the effective operating distance of what used to be manually-propelled equipment, and even of powered stackers which are operator-led; especially in warehousing operations where aisle space is at a premium.

5-B-3-c. HIGH-LIFT FORK TRUCKS —Counterbalanced Powered Hand Stackers

High-lift fork trucks built along stacker lines but without any straddle or outrigger arms. The front frame is lengthened and the battery (or batteries), the drive, and elevating mechanisms moved further from the fulcrum—the axle of the wheels under the mast. Sufficient additional counterweight is added so that the suspended load is counterbalanced.

The advantage of this type of machine over the true stacker is the absence of outrigger arms.

Telescopic and tilting models are offered. Capacities usually are limited to 2,000 lbs, with 24-in. load centers. Power may be storage battery or gas-electric.

There are two types:

1. Non-Ride Types
2. Ride Types

5-B-3-c-1. COUNTERBALANCED POWERED HAND STACKERS—

Non-Ride Types

Known also as Non-Riding Pallet-Stacking Trucks or Counterbalanced Walkie Trucks, these machines that have all the appearances of the usual walkie type equipment, except that the front ends are longer and there are no support arms or outriggers under the suspended loads. They are steered and controlled by a walking operator.

APPLICATION—Stackers of this type permit the operator to bring the machine directly to the point where he wishes to pick up or set down his load without interference from outrigger arms. This is helpful in placing loads on the tail gates of trucks and similar operations.

These trucks also can be used with flush-type pallets, which can be closely spaced; because there is no space required for the straddle arms.

5-B-3-c-2. COUNTERBALANCED POWERED HAND STACKER—Ride Types

The models which are built with larger platforms—so that the operator stands and faces the load while driving—retain all the characteristic appearances of powered walkies.

However, those with center control arrangements, in which the operator sits over the power unit and faces the load, scarcely can be differentiated from the conventional cantilever type of high-lift fork truck.

They are constructed along lighter lines and use lower capacity batteries; so that the overall dead weight for a given load-capacity is lower. They also are less expensive.

APPLICATION—As a group, these machines fall midway between the powered hand trucks and the conventional high-lift fork trucks (see below). They generally are limited in their application to relatively light loads, in rather restricted areas, and almost exclusively for indoor operations.

5-B-3-d. HIGH-LIFT FORK TRUCKS —Cantilever Fork Lift Trucks

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

Cantilever, self-loading trucks employing two upright masts between which operates a carriage supporting two, or possibly more, forks and which is elevated by a mechanical or hydraulic lifting mechanism.

Masts may be rigid or telescoping; tilting or non-tilting. Power may be electric, gasoline, diesel, gas-electric or diesel-electric.

They are all of the ride-type. In some, the operator sits; in others, he stands. The location of the controls determines whether the machine is end-control—controls at the extreme end—or center-control—controls between the power unit and the load.

The standard lowered height of masts is 83 in., but, of course, other sizes are available. Extended fork lifts are now offered as high as 16 ft. Capacities are from 1,000- to 60,000-lbs. Appropriate solid or pneumatic tires are mounted, according to the service required. Safe running speeds are provided for lighter weight models but large trucks, which can operate over open roads, attain 25 miles per hour.

APPLICATION—These machines are the backbone of the pallet system of handling. In many kinds of operations, especially in outdoor and in unstoried installations, they are the only type of equipment used; being employed for both translation and tiering.

They also are coordinated with all other kinds of handling systems. They are found on docks where ship's gear handles the pallets over shipside, in lumber yards where other equipment carries the loads for long distances and fork trucks are used to do the tiering, and in many other locations.

5-C. OTHER UNIT-LOAD SYSTEMS

Means of handling unit loads by machines which are not conventional platform- or fork-types, or by accessories which do not require the use of skids or pallets as load-carriers. There are two general types:

1. Special Machines Employing Load-Carriers
2. Special Attachments Not Employing Load-Carriers

5-C-1. Special Machines Employing Load Carriers

Machines which have been developed for handling unit loads on skids, pallets or other load-carriers, but which do not fall in the conventional lift-platform or lift-fork types of equipment. They include:

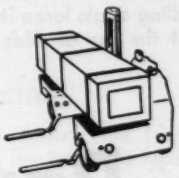
a. End-Loading Trucks
b. Side-Loading Trucks
c. Stacker Crane
d. Power Truck Fork Lift Attachments

5-C-1-a. END-LOADING TRUCKS

Also called gantry trucks and straddle trucks. These power trucks closely resemble in appearance a gantry crane mounted on four pneumatic-tired wheels. Steering is by two or four wheels. The operator rides above the inverted "U" frame, within which is carried the load. The machine functions by driving over its prepositioned load, picking it up by hydraulically actuated load hooks or shoes, carrying the load thus suspended and then setting it down at destination. The size of the "package" these trucks can handle may be as large as 108 in. high by 100 in. wide and its weight as great as 30,000 lb. Roads speeds of 30 mph are about standard, but 50 mph can be provided for if necessary. The load can be supported by the truck in several different ways—bolsters or stringers can be used athwart the truck with a cut-in portion at their ends to receive the lifting shoes. Wing-type pallets can also be handled and special trays, sturdily constructed, are frequently employed. Both gasoline and diesel models are available.

APPLICATION—Widely used in outdoor operations to transport long loads over rough terrains for considerable distances, as in handling lumber, pipe, reenforcing bars, etc. Also used to move several palletized loads within, of course, the length limits of the machine. Because these trucks cannot tier their loads they are often used to perform the transporting function and then fork trucks, cranes or similar machines are used to do the tiering.

5-C-1-b. SIDE-LOADING TRUCKS



Industial power trucks which are a combination platform truck and fork-lift truck. The platform portion of the truck has a centrally located bay or well in which is mounted the masts and elevating mechanism of a fork-lift truck. These portions can be moved back and forth across the truck so that the forks can pick up a load located at its side, elevate it, draw it back over the carrying platform and set it down on this surface where it is carried during transit. Hydraulically powered stabilizing jacks automatically slide into and out of position according to whether the machine is loading or transporting. Instead of forks, cranes and other special handling attachments may be used to lift loads. Machines are offered in various capacities from 5,000 to 30,000 lb. Loads can be lifted without any carrier or from bolsters or on pallets or trays. Both gasoline and diesel models are available.

APPLICATION—Because this truck can handle loads into piles without having to turn in the aisle it requires but 10-ft wide aisles for 90 deg-piling. It cannot, however, tier beyond the reach of its fork- or crane-arms. It is being widely used for handling long materials such as lumber and pipes in and out of gondola cars and for placing or tiering such products where it is not necessary to pile in depth.

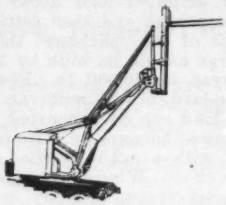
5-C-1-c. STACKER CRANES

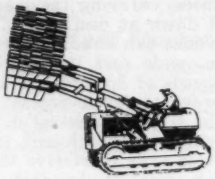
Also called tiering trolley. An overhead tiering machine comprising a rigid mast secured to a turntable built into the bed of a trolley which runs on an overhead bridge crane. The mast supports a hoisting carriage with a set of forks. Although considerable headroom is required to accommodate the overhead mechanisms, the system requires aisles but 18 in. wider than the unit load. Present capacities are from 3,000 to 6,000 lb.

APPLICATION—Among successful installations of this relatively new machine are those in chemical plants because its operation can be made completely "spark-proof." Its transporting range is limited to the building in which it is installed so that its most important possibilities seem to lie in situations where high selectivity and good space utilization are important considerations.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

5-C-1-d. POWER TRUCK FORK-LIFT ATTACHMENTS





For attachments which are used with mobile equipment such as tractors and cranes.

APPLICATION—For handling palletized loads in outdoor operations and especially for tiering such materials as lumber to higher piles than can be reached with conventional fork-lift equipment.

5-C-2. Special Attachments Not Employing Load-Carriers

Means of handling single large items or more than one item without the use of skids, pallets or other types of load-carriers. Based on the kinds of machines with which they are used there are:

a. Fork-Lift Truck Special Carriages
b. Hoist & Crane Load Carrying Devices

5-C-2-a. FORK-LIFT TRUCK SPECIAL CARRIAGES

Various kinds of carriages designed to andle unit loads as attachments to fork-lift trucks without the use of skids or pallets:

1. Clamps
   a. Barrel
   b. Multiple Barrel
   c. Bales
   d. Cartons or Crate (Single or Multiple)
2. Cranes, from which various "Below-the-Hook" attachments are suspended
3. Grabs
4. Push-Pulls
5. Rams

5-C-2-b. HOIST & CRANE LOAD-CARRYING DEVICES

Devices which can be used with hoists and cranes to handle unit loads without any other type of carrier:

1. Grabs
2. Magnets
3. Slings
4. Tongs

6 Parts and Accessories
HAULAGE SYSTEMS

Parts and accessories used with the machines included under the classification of Haulage Systems. They are grouped as follows:

A. Industrial Truck Mountings
B. Industrial Power Truck Accessories
C. Miscellaneous Industrial Truck Accessories

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

6-A. INDUSTRIAL TRUCK MOUNTINGS

The running gear used with various kinds of industrial trucks. The following classifications are used:

1. Casters
2. Wheels
3. Tires
4. Bearings

6-A-1. Casters

Industrial casters are wheels with relatively wide faces which are attached to trucks or other objects to facilitate horizontal movement. They may be attached by means of a stem or a flat top-plate and bolts; the latter being the more usual type for industrial applications.

Wheels made of various materials and treads are available to fit given loads, running surfaces, and special conditions; such as where water, oils, chemicals and other corrosive materials are encountered.

There are two basic types of casters:

a. Rigid Casters
b. Swivel Casters

Rigid casters consist of a flat top-plate with

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

bolt holes or slots and a rigid yoke, called also a fork or a horn, in which is mounted the axle which supports the wheel.

Swivel casters are those which turn through 360 deg about a vertical axle called a king pin or a king bolt. The top plate, with bolt holes or slots, has a centrally located fixed king pin, or a hole for a king bolt, and, on its under side, a ball bearing raceway. The separate fork has a flat base with a ball bearing raceway in the upper side and, usually, a smaller ball bearing raceway in the lower side for a thrust bearing.

Most industrial casters are assembled by a king bolt and nut. Ball bearings are carried in the raceways of the top plate and the fork to support the load. The thrust bearings are carried between the smaller raceway in the under side of the fork and a bearing surface which closely resembles a flat washer.

All these elements are held together in proper relationship when the nut of the king bolt is tightened. Ease of swiveling is determined largely by the amount of lead—the horizontal distance between a line through the axis of the king bolt and the axis of the wheel.

The following are typical caster wheels:

a. Canvas
b. Metal
   1. Aluminum Alloy, Plain Tread
   2. Steel
      a. Semi-Steel
         1. Plain Tread 2. Grooved Tread
      b. Pressed Steel
c. Plastic
d. Rubber-Tired
   1. Semi-Pneumatic (Zero Pressure)
   2. Solid Rubber
      a. With Metal Core
         1. Moulded-on 2. Pressed-on
      b. With Steel Side Plates (Discs)
         1. Moulded Tire
e. Wood

6-A-2. Wheels

Wheels for industrial trucks are selected for a given application with the view of meeting the following conditions:

a. The weight of the load it is to carry
b. The surface over which it is to travel (wood, concrete, gravel, macadam, asphalt, earth, etc.)
c. The nature of the load (susceptibility to shock, etc.)
d. General operating conditions (presence of grease, oil, corrosive chemicals, brine, etc.)
e. The type of operation (manual pushing or power driving—where traction is important).

The following are typical of the many kinds of wheels available:

1. Metal
   a. Aluminum Alloy, Plain Tread
   b. Malleable Iron
      1. Plain Tread 2. Grooved Tread
   c. Semi-Steel
      1. Plain Tread 2. Grooved Tread
2. Moulded Composition with Metal Core
   a. Hard Rubber Tread
   b. Soft Rubber Tread
3. Rubber-Tired Wheels
   a. Pneumatic
   b. Semi-Pneumatic, Zero Pressure
   c. Solid Rubber with Metal Core
      1. Moulded-on 2. Pressed-on
4. Spoke Wheels
   a. Steel Rim, Metal Spoke
   b. Steel Rim, Wood Spoke
   c. Wood Rim, Wood Spoke

6-A-3. Industrial Tires

The following types of tires are used with industrial trucks:

a. Pneumatic—Tire with Separate Inner Tube
b. Semi-Pneumatic—No Inner Tube, Zero Pressure
c. Solid Rubber Tires with Metal Rims
   1. Moulded-on 2. Pressed-on

6-A-4. Bearings

Devices used to reduce the friction between a wheel and its axle. The following types are available:

a. Plain
b. Self-Lubricating
   1. Straight 2. Needle 3. Tapered
c. Ball
d. Roller
e. Combination Ball and Roller

6-B. INDUSTRIAL POWERED TRUCK ACCESSORIES

The various accessories used with industrial power trucks are classified as follows:

1. Sources of Power
2. Storage Battery Accessories
3. Miscellaneous Accessories and Supplies

6-B-1. Sources Of Power

The various sources of supplying power to industrial powered trucks are of four general kinds: Electric storage batteries, gasoline and diesel engines, and generating units driven by gasoline or diesel engines. The latter generate direct current to charge the electric storage battery while it is in service on the truck.

These various methods require the following accessories:

a. Fuels
b. Storage Batteries
c. Ready-Power Units

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

6-B-1-a. FUELS

Two types of fuel are used to power industrial trucks:
1. Gasoline 2. Diesel Oil

6-B-1-b. STORAGE BATTERIES

A storage battery is an electro-chemical device which generates electrical pressure (voltage) by chemical action.

The make-up of industrial batteries is designated by a symbol of three parts. The first number indicates the number of cells; the next, the type of cell (this varies with different manufacturers); and the third tells the number of plates. Thus, 6 TLM 11 means that the battery is made up of six cells of type TLM, and contains eleven plates.

The ampere-hour capacity of a battery is a measure of the quantity of electricity which the battery is capable of providing.

The materials used in the construction of a battery vary. Two types are used in industrial service:
1. Lead-Acid Type Batteries
2. Nickel-Iron-Alkaline Type Batteries

6-B-1-c. READY-POWER UNITS

These direct current generating units driven by a fuel-powered engine and carried on a truck as a means of charging an electric storage battery so it, in turn, can supply direct current to the truck. The charging is done while the truck is in service.

Based on the kind of prime mover used, there are two types:
1. Gasoline-Electric 2. Diesel-Electric

6-B-2. Storage Battery Charging Equipment

Unless a storage battery is charged during service —see 6-B-1-c—READY-POWER UNITS—it must be charged by other means. Generally, it is not satisfactory to charge an industrial storage battery directly from an ordinary direct current line. Some form of charger is needed to supply direct current with satisfactory characteristics, and to control the operation throughout.

6-B-2-a. BATTERY CHARGERS

There are two distinctly different methods used to charge storage batteries. According to the equipment used, they are:
1. Motor-Generator Sets 2. Rectifiers

6-B-2-a-1. MOTOR-GENERATOR SETS

A means of supplying direct current to a battery (for the purpose of charging it) which employs a motor—either direct or alternating current, depending upon the source of supply—to drive a direct current generator.

Highly developed controls make this method of charging practically automatic. The system must, of course, be engineered to the type of battery being charged.

6-B-2-a-2. RECTIFIERS

A means of converting alternating current to direct current for charging batteries.

Rectifiers cause the alternating current to pass through a "stack" made up of two materials. One material, of low resistance, permits free flow of current in one direction. The other material, of high resistance, effectively checks the flow in the opposite direction.

The construction of rectifiers is very simple. There is but one moving element—a fan to dissipate the heat generated in the stack. Based on the materials used in the stack, there are two types of rectifiers used in industrial applications:

a. Copper Oxide b. Selenium Oxide

6-B-2-b. BATTERY PARTS AND ACCESSORIES

Reducing a broad and highly technical field to simple elements, from the standpoint of the average industrial user, we have:
1. Connectors
   a. Cable
   b. Cable Terminal
   c. Cell
2. Charging Plugs and Receptacles
3. Charge Controls
4. Cell Fillers
5. Hydrometer Syringes
6. Voltage Testers

6-B-3. Miscellaneous Accessories and Supplies

Many useful accessories time- and labor-saving devices and special supplies are available to extend the usefulness of materials handling equipment, and to insure safe, trouble-free operation. Among the most fundamental are:
a. Lubricants
b. Lubricating Systems
c. Exhaust Neutralizers
d. Safety Fuel Cans

7 Parts and Accessories

ELEVATING SYSTEMS

The parts and devices used with these systems are classified as:

A. Elevator Accessories B. Hoist Accessories

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

7-A. ELEVATOR ACCESSORIES

A number of special accessories are being used in connection with elevating operations. Some of these are described in Section 8 in connection with Conveying Systems, others will be found below. As for Freight Elevator accessories, there are several safety devices and special controls. However, the basic and most frequently used accessories are shown below:

1. Elevator Belting
2. Freight Elevator Accessories
   - a. Doors
   - b. Sills

7-B. HOIST ACCESSORIES

Most accesory items in this category have to do with special applications or special service requirements. The general list of basic accessories is shown below.

1. Blocks 2. Chain Wheels
3. Current Conductor and Collector Systems
4. Limit Switches 5. Variable Speed Controls
6. Air Compressor Systems
7. Load Carriers
   - a. Grabs b. Hooks c. Slings
     1. Chain 2. Wire Rope 3. Woven Wire
   - d. Tongs

8 Parts and Accessories
CONVEYING SYSTEMS

Various parts and accessories used with conveying systems, classified according to:

A. Gravity Systems
1. Wheel Conveyors
2. Roller Conveyors
B. Powered Systems

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

8-A. GRAVITY CONVEYORS

A wide range of efficient accessory items are available for Gravity Conveying Systems, and which will improve their performance. The most common items are listed below:

1. Wheel Conveyors
   - a. Parts (Wheels, Axles, etc.)
     1. Aluminum 2. Steel 3. Other
   - b. Complete Sections (Straight, Curves, Switches, Hinged, etc.)
     1. Aluminum 2. Steel 3. Other
   - c. Guard Rails
     1. Non-Adjustable 2. Adjustable
   - d. Supports
     1. Non-Adjustable 4. Castered
     2. Adjustable 5. Ceiling Hangars
     3. Stationary 6. Wall Brackets
   - e. Package Controls
     1. Flow Controls ("Traffic Cops")
     2. Stops
     3. Counters
        - a. Mechanical
        - b. Electrical
        - c. Electronic
   - f. Ball Transfers
     1. Ball Assemblies 2. Plates or Tables
     3. Shields
2. Roller Conveyors
   - a. Rollers
     1. Aluminum 4. Plastic
     2. Brass 5. Steel
     3. Magnesium 6. Wood

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

b. Bearings
   1. Ball
      a. Plain b. Semi-Enclosed
      c. Fully-Enclosed
c. Sections (Straight, curves, switches, etc.)
   1. Aluminum 2. Magnesium
   3. Steel
d. Guard Rails
   1. Non-Adjustable 2. Adjustable
e. Supports
   1. Non-Adjustable 4. Castered
   2. Adjustable 5. Ceiling Hangars
   3. Stationary 6. Wall Brackets
f. Package Controls
   (See 8-A-1-e above)

8-B. POWERED CONVEYORS

As in the case of Gravity Conveyors, there are many specially designed accessories in use for Powered Conveyors. Basic accesories are shown below, but a glance at the items listed under Gravity Conveyors is suggested, as some also are suitable for powered installations.

1. Belting
   a. Canvas, Stitched d. Heat Resistant
   b. Cotton, Woven e. Rubber Covered
   c. Impregnated f. Stainless Steel
   g. Woven Wire
2. Cable
3. Chain
4. Magnetic Pulleys
5. Rollers, End and Idler
6. Power Elements
   a. Complete Power Units c. Speed Reducers
   b. Control Boxes d. Variable Speed Drives
7. Guard Rails
   a. Non-Adjustable
   b. Adjustable
8. Supports
   a. Non-Adjustable d. Castered
   b. Adjustable e. Ceiling Hangers
   c. Stationary f. Wall Brackets
9. Package Controls
   (See 8-A-1-e above)
10. Trolleys and other Overhead System Parts and Accessories see Section 9.
    b. Bridges
       1. Manual
       2. Powered
    c. Controllers
    d. Interlocks
    e. Load-Carriers
       (See 7-B-7.—HOIST ACCESSORIES—Load Carriers)
2. Power (Mobile) Cranes
   (For wheels, tires, fuel, lubricants, etc., see 6-B.—INDUSTRIAL POWERED TRUCK ACCESSORIES)
   a. Crane Front-End Attachments
      1. For Bulk Materials
         a. Clamshell c. Orange Peel
         b. Dragline d. Magnet
      2. For Heavy Items
         a. Hook Blocks
            1. With Single Sling
            2. With Bridle Sling
         b. Hooks
            1. Hair Pin 2. Special
      3. For Loose or Stacked Materials
         a. Clamps
         b. Grabs
         c. Grapples
         d. Tongs
      4. For Containers or Weights
         a. Concrete Buckets
         b. Skips
         c. Tote Box
         d. Skull Crackers

9 Parts and Accessories

TRANSFERRING SYSTEMS

The parts and accessories used with these systems of handling are classified here as those associated with:

A. Monorail Systems
B. Crane Systems
1. Overhead Cranes
2. Power (Mobile) Cranes

While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Many items have been omitted because most of them should be engineered into a handling system.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

9-A. MONORAIL SYSTEMS

Many monorail installations lend themselves excellently to integration with other equipment, dip tanks, heating chambers and so on. Also, there are many special product-carrying accessories. Because many of these are used to solve problems, only the common accessories are shown below.

1. Monorail Track (Straight, cross, switch, curve, turntable and similar sections)
2. Track Hangars
3. Current Distribution Systems
4. Controls
5. Trolleys a. Manual b. Powered
6. Trolley Wheels
7. Trolley Tractors

9-B. CRANE SYSTEMS

Quite a few accessories are available for Crane Systems. Essentially, they are used for specific applications, some are specially designed. The most widely used are shown below.

1. Overhead Cranes
   a. Brakes
      1. Hydraulic
      2. Mechanical

10 Parts and Accessories

SELF-LOADING SYSTEMS

The devices included here are classified according to:
A. Fork Trucks B. Unit-Loads
While every attempt has been made to be thorough, the listings in this Section are not exhaustive. Photo-electric cells, for example, are not mentioned specifically, yet they could be used profitably somewhere along the line with most handling systems. Many similar items have been omitted because most of them should be engineered into a handling system.

10-A. FORK TRUCKS

The parts and accessories pertaining to self-loading machines as industrial powered trucks (wheels, tires, batteries, etc.) are included in 6-B.—INDUSTRIAL POWER TRUCK PARTS AND ACCESSORIES. The following items pertain strictly to the specific types of machines:

1. Low-Lift Fork Truck Accessories
   a. Skid Platform Adapters
2. High-Life Fork Truck Accessories
   a. Special Fork Types b. Fork Extensions
   c. Special Carriages and Attachments
      1. Extra High-Lift
      2. Hydraulic Pushers
      3. Revolving Forks
      4. Scoops
      5. Side Shifting Forks
      6. Snow Plows
      7. Sweepers
   d. Back Stops e. Overhead Guards

10-B. UNIT-LOADS

The following devices are utilized either in creating or facilitating the handling of unit loads:

1. Automatic Pallet Loaders
2. Unit Load Binders
3. Adhesives
4. Adhesive Applicators
5. Tape
6. Tape Dispensers
7. Steel Strapping
   a. Flat b. Round
8. Strapping Tools
   a. Flat b. Round
9. Skid and Pallet Storage Racks
10. Carton Shields

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

11 Parts and Accessories

BUILDING MAINTENANCE

The items included here are those accessories used to facilitate materials handling, and those for the maintenance of buildings and properties. They are arranged according to the following operating locations:

A. Freight Cars
B. Motor Trucks and Trailers
C. Loading Platforms
D. Buildings and Yards

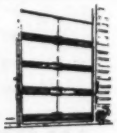
The parts and accessory items listed under these headings are complete within common usage. For example, handling equipment must be maintained but no such equipment is listed, that would go beyond the scope of this section.

11-A. FREIGHT CARS —HANDLING

To list all known accessories that can be used in handling freight cars would require too great a broadening of the classification given here.

For example, portable lights are available when loading and unloading freight cars at night or when natural light is too poor. However, such items are special purpose and belong in a more general category. Those commonly associated with freight cars are:

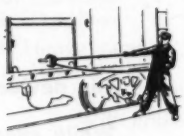
1. Bulkheads
2. Bulkhead Anchors
3. Car-Door Load Bracers



4. Car Liners

5. Car Prys
6. Car Pullers

7. Yard Switch Engines
   (Also called car spotters)
   a. Automotive
      1. On-off Track
   b. Diesel
8. Door Openers

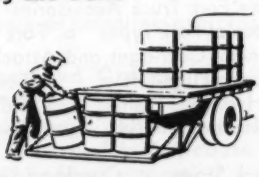


9. Dockboards
   a. Aluminum
   b. Magnesium
   c. Steel

11-B. HIGHWAY TRUCKS AND TRAILERS —HANDLING

This is another section that could be liberally expanded when considering accessory items. Some trucks, for example, carry wheel skids, pads, and such items. Because they are normally required for loading and unloading certain types of freight, they are too specific for the list below, which is intended to be more general.

1. Elevating End-Gates



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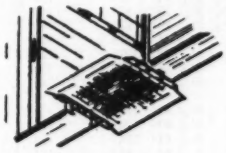
2. Tail Gate Skids
   a. Aluminum
   b. Magnesium
3. Wheel Chocks

4. Dockboards
   a. Aluminum
   b. Magnesium
   c. Steel

11-C. LOADING PLATFORMS —HANDLING

There is a multitude of items available for platform work that are not listed below. Some shippers, for example, use office dictating machines to aid checking cargoes being loaded or unloaded. Such items really are part of a system and are not included.

1. Bridge Plates (Ramps)



   a. Manual (Dockboards)
      1. Aluminum
      2. Magnesium
      3. Steel
   b. Powered
2. Canopies
3. Cross-Over Bridges

4. Elevating Platforms
   a. Electric
   b. Hydraulic
   c. Mechanical
5. Communication Systems

11-D. BUILDINGS AND YARDS —HANDLING

This classification has been broadened intentionally, but within close limits. For example, for safe handling of goods in storage fire protection is necessary; floors must be kept in good condition or loads being carried can be spilled and damaged, or personnel injured. The following are considered basic:

1. Aisle (Floor) Markers
2. Bins
3. Fire Protection
   a. Alarms
      1. Automatic
      2. Manual
   b. Extinguishers
   c. Extinguisher Systems
   d. Hose
   e. Smoke Detection Systems
   f. Sprinklers
      1. Automatic Systems
      2. Supervisory Service
4. Floor Maintenance
   a. Patches and Resurfacers
   b. Scrubbers

   c. Sweepers
   d. Vacuum Cleaners
5. Sanitation
   a. Fumigants
   b. Insecticides
   c. Rodenticides
   d. Rodent Traps
6. Security
   a. Burglar Alarms
   b. Industrial Fencing
   c. Watchman's Clocks
   d. Watchman Service
7. Storage Protection
   a. Covers
   b. Pads
   c. Shelving

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED HIGH-LIFT FORK

Due to space limitations basic models only are presented for each of the companies represented. A multitude of

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	OVERALL DIMENSIONS: Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Overall—Including Carriage or Backguard
1	Atlas 3EA62	6000	27	5200*		Ptf		Y					27	104	54†					82†				62†		
2	Automatic Shipper BF-15	1500	15	4395*	S	Fk	Hyd	Y	10	5	39	13¼	18†	58¼	30†		5	3	58	68†		118†		108†		144
3	BF-15	1500	15	4500*	S	Fk	Hyd	Y	10	5	39	13¼	18†	58¼	30†		5	3	68	83†		147†		132†		168
4	Shipper BF-20	2000	15	5180*	S	Fk	Hyd	Y	10	5	39	13½	24†	61¾	36†		5	3	58	68†		118†		108†		144
5	BF-20	2000	15	5669*	S	Fk	Hyd	Y	10	5	48	13½	24†	71	36†		5	3	68	83†		147†		132†		168
6	BF-30	3000	24	6388*	S	Fk	Hyd	Y	10	5	48	14	24†	74	36†		5	3	68	83†		147†		132†		168
7	BF-40	4000	24	7379*	S	Fk	Hyd	Y	10	5	48	14	24†	78	36†		5	3	68	83†		147†		132†		168
8	BF-40AE	4000	24	7250*	St	Fk	Hyd	Y	10	5	40	14	18†	82¾	36†		5	3	68	83†		147†		132†		168
9	CF-10	1000	15	4450*	S	Fk	Hyd	Y	10	3	42	12¼	24†	64⅞	36†		4¼	2½	68	83†		147†		132†		182
10	CF-15	1500	15	4450*	S	Fk	Hyd	Y	10	3	42	12¼	24†	64⅞	36†		4¼	2½	68	83†		147†		132†		182
11	CF-20	2000	15	4760*	S	Fk	Hyd	Y	10	3	42	12¼	24†	65¾	36†		4¼	2½	68	83†		147†		132†		182
12	CF-30	3000	24	5475*	S	Fk	Hyd	Y	10	3	42	12½	24†	69¼	36†		4¼	2½	68	83†		147†		132†		182
13	CF-40	4000	24	5490*	S	Fk	Hyd	Y	10	3	42	12½	15†	69¼	36†		4¼	2½	68	83†		147†		132†		182
14	CLA	800	15	1540	W	Fk	Hyd	N	10	5	35	5⅞	18†	49¾	36†		2⅝	1½	69	83†		83†		69†		93
15	CLB	1000	15	1570	W	Fk	Hyd	N	10	5	35	5⅞	18†	49¾	36†		2⅝	1½	69	83†		83†		69†		93
16	CLTA	650	15	1790	W	Fk	Hyd	Y	10	5	35	5⅞	18†	49¾	36†		2⅝	1½	68½	83†		150½†		136†		180
17	CLTB	810	15	1820	W	Fk	Hyd	Y	10	5	35	5⅞	18†	49¾	36†		2⅝	1½	68½†	83†		150½†		136†		180
18	ESST-20	2000	15		St	Fk	Hyd	Y	N	N	50		24†		42†		2¼	2½	67½	83†		148†		132½†		
19	ESST-30	3000	24		St	Fk	Hyd	Y	N	N	50		24†		42†		2¼	2¼	66½	83†		146½†		130†		
20	ESST-40	4000	24		St	Fk	Hyd	Y	N	N	50		24†		42†		2¼	2¼	66½	83†		146½†		130†		
21	FF-10	1000	15	2474*	S	Fk	Hyd	Y	12½	2½	30	11½	24†	52¾	36†		3⅝	3½	68	78†		144†		134†		170
22	FF-15	1500	15	2871*	S	Fk	Hyd	Y	12½	2½	30	11½	15†	53¼	30†		3⅝	3½	68	78†		144†		134†		170
23	GLF-40	4000	24	7600	S	Fk	Hyd	Y	10	5	52	14¾	24†	79¾	36†		5¼	3¼	24†	83†		143½		125	130	149
24	GLF-50	5000	24	8100	S	Fk	Hyd	Y	10	5	52	14¾	24†	82¾	36†		5¼	3¼	24†	83†		143½		125	130	149
25	GLF-60	6000	24	8600	S	Fk	Hyd	Y	10	5	52	14¾	24†	85¾	42†		5¼	3¼	24†	83†		143½		125	130	149
26	HF-200	20000	36	31970*	St	Fk	Hyd	N	N	N	96		42†				6	6½	88†	127†		127†		88†		
27	HF-250	25000	SA		St	Fk	Hyd	N	N	N	96		45†				6	6½	88†	127†		127†		88†		
28	HF-300	30000	SA	43500*	St	Fk	Hyd	N	N	N	96		48†				6	6½	88†	129†		129†		88†		
29	HF-400	40000	SA	56400*	St	Fk	Hyd	N	N	N	108		48†				6	6½	72†	118†		129†		72†		
30	HF-500	50000	SA	65500*	St	Fk	Hyd	N	N	N	108		48†				6	6½	61†	118†		118†		61†		
31	HF-600	60000	SA	75800*	St	Fk	Hyd	N	N	N	110		48†				6	6½	61†	124†		124†		61†		
32	HF-800	80000	SA	76000*	St	Fk	Hyd	N	N	N	110		30†				6	6½	61†	124†		124†		61†		
33	LF-30	3000	24	7480*	St	Fk	Hyd	Y	10	5	55	14⅛	24†	78½	36†		4½	3		64	83†	143†		124†		160
34	LF-40	4000	24	8600*	St	Fk	Hyd	Y	10	5	55	14⅜	24†	82⅛	36†		4¾	3		64	83†	143†		124†		160
35	LF-50	5000	24	9330*	St	Fk	Hyd	Y	10	5	55	14⅜	24†	82⅛	36†		4½	3		64	83†	143†		124†		160
36	LF-60	6000	24	10200*	St	Fk	Hyd	Y	10	5	55	14⅜	24†	83⅝	42†		4½	3		64	83†	143†		124†		160
37	LF-70	7000	24	11200*	St	Fk	Hyd	Y	10	5	56	17⅝	24†		42†		5½	3		61	83†	137†		115†		151
38	LF-80	8000	24	12075*	St	Fk	Hyd	Y	10	5	56	17⅝	24†		42†		5½	3		61	83†	137†		115†		151
39	LF-90	9000	24	12400*	St	Fk	Hyd	Y	10	5	60	17⅞	24†		42†		5½	3		59	83†	134†		110†		148
40	LF-100	10000	24	13400*	St	Fk	Hyd	Y	10	5	60	17⅞	24†		42†		5½	3		59	83†	134†		110†		148
41	LFS-30	3000	24	7480*	S	Fk	Hyd	Y	10	5	53		24†		36†		4½	3		64	83†	143†		124†		160
42	LFS-40	4000	24	8600*	S	Fk	Hyd	Y	10	5	53	14⅜	24†	81⅜	36†		4½	3		64	83†	143†		124†		160
43	LFS-50	5000	24	9330*	S	Fk	Hyd	Y	10	5	53	14⅜	24†	82⅝	36†		4½	3		64	83†	143†		124†		160
44	LFS-60	6000	24	10200*	S	Fk	Hyd	Y	10	5	53	14⅜	24†	84⅛	42†		4½	3		64	83†	143†		124†		160
45	LFS-70	7000	24	11200*	S	Fk	Hyd	Y	10	5	55	17⅝	24†	90⅝	42†		5½	3		61	83†	137†		115†		151
46	LFS-80	8000	24	12075*	S	Fk	Hyd	Y	10	5	55	17⅝	24†	92⅛	42†		5½	3		61	83†	137†		115†		151
47	LFS-90	9000	24	12400*	S	Fk	Hyd	Y	10	5	60	17⅞	24†	93⅞	42†		5½	3		59	83†	134†		110†		146
48	LFS-100	10000	24	13400*	S	Fk	Hyd	Y	10	5	60	17⅞	24†	95⅛	42†		5½	3		59	83†	134†		110†		146
49	RTT	2000	15	4000*	S	Fk	Hyd	Y	10	5	39⅛	11⅝	24†	60¼	36†		4½	2		68	83†	147†		132†		168
50	SCL	2000	15	2780	W	Fk	Hyd	N	18	3	45	7	24†	64½	36†		4	2		67	83†	83†		67†		103
51	SCLH	2500	24	3260	W	Fk	Hyd	N	18	3	45	7½	24†	67¾	36†		4	2		67	83†	83†		67†		103
52	SCLT	2000	15	3015	W	Fk	Hyd	Y	18	3	45	7	24†	64½	36†		4	2		67	83†	83†		131†		167
53	SCLTH	2500	24	3495	W	Fk	Hyd	Y	18	3	45	7½	24†	67¾	36†		4	2		67	83†	83†		67†		103
54	SO	4000	24	2200	W	Ptf	Hyd	N	N	N	54		18†		36†		1⅜	1⅜	66	83†		83†		66†		102
55	SOT	4000	24	2600	W	Fk	Hyd	Y	N	N	60		18†		36†		1⅜	1⅜		83†				128†		164
56	SPH-4	4000	24	1900	W	Ptf	Hyd	N	N	N	55		24†		48†		2⅝	2⅝	70	83†		83†		70†		85
57	SPH-5	5000	24	2050	W	Ptf	Hyd	N	N	N	55		24†		48†		2⅝	2⅝	70	83†		83†		70†		85
58	SPL-4	4000	24	1800	W	Ptf	Hyd	N	N	N	55		24†		48†		2¼	2¼	70	83†		83†		70†		85
59	SPL-5	5000	24	1950	W	Ptf	Hyd	N	N	N	55		24†		48†		2¼	2¼	70	83†		83†		70†		85
60	SS	4000	24	2450	W	Fk	Hyd	N	N	N	54		18†		36†		2	2	66	83†		83†		66†		102
61	SST	4000	24	3000	W	Fk	Hyd	Y	N	N	60		18†		36†		2	2		83†				128†		164
62	THR-12	12000	36	17800*	St	Fk	Ch	N	10	3	68	19¼	30†	112⅝	48†		4¼	3¼		83†		83†		49		85
63	THR-14	14000	36	20650*	St	Fk	Ch	N	10	3	70	19¼	36†	117¼	48†		4¼	3¼		83†		83†		49		85
64	THR-15	15000	36	21450*	St	Fk	Ch	N	10	3	70	19¼	36†	117¼	48†		4¼	3¼		83†		83†		49		85
65	THR-16	16000	36	22900*	St	Fk	Ch	N	10	3	70	19¼	39†	117¼	48†		4¼	3¼		83†		83†		49		85
66	THR-18	18000	36	24200*	St	Fk	Ch	N	N	N	70	19	39†	117	48†		4¼	3¼		83†		83†		49		85
67	THTF-M-10	10000	24	16125*	St	Fk	Ch	Y	10	3	68	18⅛	24†	111¾	42†		4	3		83†				98†		134
68	TLN-2	4000	24	3650	St	Ptf	Ch	N	N	N	65		30†				4½	4½	60†	79½†		79½		60†		79½
69	TLN-3	6000	24	4425	St	Ptf	Ch	N	N	N	65		30†				3¾	3¾	60†	81†		81		60†		81
70	TLO-5	10000	24	6000	St	Ptf	Ch	N	N	N	78		30†				3	4½	60†	83†		83		60†		83

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

OR PLATFORM TRUCKS

variations, to fit the needs of the individual user, are available from any of the manufacturers listed.

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Truck Forward (mph)	Truck Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
		61[A]		Own 1175	5	30	306	N	3	3	N	4.5	4.5	12	12	Y					1
	2½[A]	54[A]	100[A]	Own		24		N	4	4	N	5.0	5.0	20	FV	Y	20x5	10x5	Opt		2
	2½[A]	54[A]	100[A]	Own		32		N	4	4	N	5.0	5.0	15	FV	Y	20x5	10x5	Opt		3
	2½[A]	57[A]	107[A]	Own		24		N	4	4	N	5.0	5.0	19	FV	Y	20x5	10x5	Opt		4
	6[A]	60[A]	117[A]	Own		32		N	4	4	N	6.0	6.0	30	FV	Y	20x5	15x5	Opt		5
	5[A]	61[A]	119[A]	Own		32		N	4	4	N	4.6	4.6	26	FV	Y	20x6	15x5	Opt		6
	4[A]	64[A]	121[A]	Own		32		N	4	4	N	5.5	5.5	22	FV	Y	20x7	15x5	Opt		7
	2½[A]	66[A]	122[A]	Own		30		N	3	3	N	5.2	5.2	18	FV	Y	20x7	15x5	Opt		8
	0[A]	58[A]	110[A]	Own		32		N	4	4	N	6.4	6.4	37	45	Y	17x5	12x3½	Opt		9
	0[A]	58[A]	110[A]	Own		32		N	4	4	N	6.4	6.4	36	45	Y	17x5	12x3½	Opt		10
	0[A]	58[A]	110[A]	Own		32		N	4	4	N	6.3	6.3	35	45	Y	17x5	12x3½	Opt		11
	0[A]	62[A]	114[A]	Own		32		N	4	4	N	5.6	5.6	33	45	Y	17x6	12x4½	Opt		12
	0[A]	62[A]	114[A]	Own		32		N	4	4	N	5.3	5.3	27	45	Y	17x7	12x4½	Opt		13
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		14
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		15
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		16
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		17
				Auto-Lite	1½	12		N	3	3	N				FV	Y	10x4	4½x2¾	N		18
				Auto-Lite	1½	12		N	3	3	N				FV	Y	10x4	4½x2¾	N		19
				Auto-Lite	1½	12		N	3	3	N				FV	Y	10x4	4½x2¾	N		20
	0[A]	52[A]	91½[A]	Auto-Lite	1½	24		N	3	3	N	5.8	5.8	35	FV	Y	17x6	16x3½	Opt		21
	0[A]	52[A]	91½[A]	Auto-Lite	1½	24		N	3	3	N	5.5	5.5	30	FV	Y	17x6	16x4	Opt		22
	0[A]	67[A]	126[A]	Cont F-162	38			Ele	Inf	Inf	N	8.0	8.0	40	60	N	22x7	16¼x5	Opt		23
	0[A]	69[A]	129[A]	Cont F-162	38			Ele	Inf	Inf	N	8.0	8.0	40	60	N	22x8	16¼x6	Opt		24
	0[A]	73[A]	137[A]	Cont F-162	38			Ele	Inf	Inf	N	8.0	8.0	40	60	N	22x9	16¼x7	Opt		25
				Own		(1)		N	3	3	N				FV	Y	36x12	20x8			26
				Own		(1)		N	3	3	N				FV	Y	36x14	20x8			27
				Own		(1)		N	3	3	N				FV	Y	36x16	20x9			28
				Own		(1)		N	3	3	N				FV	Y	36x18	20x10			29
				Own		(1)		N	3	3	N				FV	Y	36x20	22x10			30
				Own		(1)		N	3	3	N				FV	Y	36x24	22x12	N		31
				Own		(1)		N	3	3	N				FV	Y	(2)	22x14	N		32
	6[A]	67[A]	128[A]	Own		30		N	3	3	N	5.0	5.0	18	FV	Y	20x6	15x5	Opt		33
	5[A]	71[A]	131[A]	Own		36		N	3	3	N	6.0	6.0	20	FV	Y	20x7	15x5	Opt		34
	4[A]	71[A]	131[A]	Own		36		N	3	3	N	5.8	5.8	19	FV	Y	20x8	15x7	Opt		35
	3[A]	74[A]	138[A]	Own		36		N	3	3	N	5.7	5.7	18	FV	Y	20x9	15x7	Opt		36
				Own		48		N	4	4	N	5.4	5.4	18	FV	Y	22x10	15x8	Opt		37
				Own		48		N	4	4	N	5.3	5.3	17	FV	Y	22x10	15x8	Opt		38
				Own		48		N	4	4	N	4.9	4.9	15	FV	Y	22x12	15x8	Opt		39
				Own		48		N	4	4	N	4.7	4.7	13	FV	Y	22x12	15x8	Opt		40
				Own				N	4	4	N				FV			15x5	Opt		41
	5[A]	71[A]	131[A]	Own		36		N	4	4	N	6.0	6.0	20	FV	Y	20x7	15x5	Opt		42
	4[A]	72[A]	132[A]	Own		36		N	4	4	N	5.8	5.8	19	FV	Y	20x8	15x7	Opt		43
	3[A]	74[A]	138[A]	Own		36		N	4	4	N	5.7	5.7	18	FV	Y	20x9	15x7	Opt		44
	2[A]	79[A]	145[A]	Own		48		N	4	4	N	5.4	5.4	18	FV	Y	22x10	15x8	Opt		45
	2[A]	79[A]	145[A]	Own		48		N	4	4	N	5.3	5.3	17	FV	Y	22x10	15x8	Opt		46
	2[A]	80[A]	148[A]	Own		48		N	4	4	N	4.9	4.9	15	FV	Y	22x12	15x8	Opt		47
	2[A]	80[A]	148[A]	Own		48		N	4	4	N	4.7	4.7	13	FV	Y	22x12	15x8	Opt		48
	3[A]	57[A]	108[A]	Auto-Lite	1½	24		N	3	3	N	4.3	4.3	12	FV	Y	15x6	10x6	Opt		49
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x6	N		50
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x7	N		51
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x6	N		52
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x7	N		53
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x5	3½x2¾	N		54
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	3½x2¾	N		55
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x5	10x4½	N		56
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x4½	N		57
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x5	5½x4½	N		58
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x6	5½x4½	N		59
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	5x3½	N		60
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	5x3½	N		61
	5[A]	94[A]	176[A]	Own		48		N	3	3	N	5.0	5.0	14	AB	Y	22x12	15x9	Opt		62
	10[A]	97[A]	184[A]	Own		(3)		N	3	3	N	4.6	4.6	10-13	AB	Y	22x14	15x7	Opt		63
	10[A]	97[A]	184[A]	Own		(3)		N	3	3	N	4.5	4.5	9-12	AB	Y	22x14	15x7	Opt		64
	8[A]	98[A]	184[A]	Own		(3)		N	3	3	N	4.4	4.4	8-11	AB	Y	22x16	15x8	Opt		65
	8[A]	98[A]	184[A]	Own		(3)		N	3	3	N	4.2	4.2	6-9	AB	Y	22x16	15x8	Opt		66
	2[A]	92[A]	169[A]	Own		48		N	3	3	N	5.2	5.2	11-12	35[B]	Y	22x12	15x9	Opt		67
	46[A]	61[A]		Own		30		N	4	4	N	5.2	5.2	11	DB	Y	22x4½	9x5	N		68
	46[A]	62[A]		Own		(4)		N	4	4	N	4.2	4.2	14	DB	Y	20x6	10x6	N		69
	62[A]	69[A]		Own		(4)		N	3	3	N	4.9	4.9	8-10	DB	Y	20x7	10x8	N		70

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (in.)	Service Weight (lb.)—Excluding Battery	Operator—Stis, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	OVERALL DIMENSIONS: Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Overall Width—Carriage or Backguard
1	Baker FL-10	1000	24	2650	S	Fk	Hyd	Y	10	3	36½	10⅝	24°	60½	....	38	4¼	2½	60	69	83	87	150	104	132	104
2	FLE-10	1000	24	2650	S	Fk	Hyd	Y	10	3	36½	10¾	24°	60½	....	38	4¼	2½	5	69	83	87	148	78	130	102
3	FL-15	1500	24	2750	S	Fk	Hyd	Y	10	3	38½	10¾	24°	60½	....	38	4¼	2½	60	69	83	87	150	104	132	104
4	FLE-15	1500	24	2750	S	Fk	Hyd	Y	10	3	38½	10¾	24°	60½	....	38	4¼	2½	5	69	83	87	148	78	130	102
5	FP-15	1500	24	2750	St	Fk	Hyd	Y	10	3	47	10¾	24°	66	....	38	4	2½	60	59	83	77	150	71	132	104
6	FPE-15	1500	24	2780	St	Fk	Hyd	Y	10	3	47	10¾	24°	66	....	38	4	2½	5	59	83	77	148	71	130	102
7	FS-20	2000	24	3400	S	Fk	Hyd	Y	10	3	38	14½	24°	69	....	38	4¼	2½	60	69	83	87	150	104	132	104
8	FSE-20	2000	24	3400	S	Fk	Hyd	Y	10	3	38	14½	24°	69	....	38	4¼	2½	5	69	83	87	148	78	130	102
9	FS-25	2500	24	4050	S	Fk	Hyd	Y	10	3	38	15	24°	71	....	38	4¼	2½	5	69	83	87	150	104	132	104
10	FSE-25	2500	24	4050	S	Fk	Hyd	Y	10	3	38	15	24°	71	....	38	4¼	2½	60	69	83	87	148	78	130	102
11	FT-30-S	3000	24	5000	S	Fk	Hyd	Y	10	3	40	16¾	24°	70½	....	38	5	2½	58½	69	83	121	148	102	130	102
12	FTE-30-S	3000	24	5000	S	Fk	Hyd	Y	10	3	40	16¾	24°	70½	....	38	5	2½	5	69	83	97	149	78	130	102
13	FT-30	3000	24	5100	S	Fk	Hyd	Y	10	3	43	16¾	24°	75	....	38	5	2½	58½	69	83	121	149	102	130	102
14	FTE-30	3000	24	5100	S	Fk	Hyd	Y	10	3	43	16¾	24°	75	....	38	5	2½	5	69	83	121	149	78	130	102
15	FC-30	3000	24	4900	St	Fk	Hyd	Y	10	3	43	16¾	24°	77¾	....	38	5	2½	58½	69	83	121	149	78	102	102
16	FCE-30	3000	24	4900	St	Fk	Hyd	Y	10	3	43	16¾	24°	77¾	....	38	5	2½	5	69	83	121	149	78	130	102
17	FT-40	4000	24	5650	S	Fk	Hyd	Y	10	3	43	16¾	24°	79	....	38	5	2½	58½	69	83	121	149	102	130	102
18	FTE-40	4000	24	5650	S	Fk	Hyd	Y	10	3	43	16¾	24°	79	....	38	5	2½	5	69	83	121	149	78	130	102
19	FC-40	4000	24	5400	St	Fk	Hyd	Y	10	3	43	16¾	24°	79¼	....	38	5	2½	58½	69	83	121	149	102	130	102
20	FCE-40	4000	24	5400	St	Fk	Hyd	Y	10	3	43	16¾	24°	79¼	....	38	5	2½	5	69	83	121	149	78	130	102
21	FD-40	4000	24	7800	S	Fk	Hyd	Y	10	3	43	.....	24°	83	....	38	5	2½	58½	69	83	121	149	102	130	102
22	FDE-40	4000	24	7500	S	Fk	Hyd	Y	10	3	43	.....	24°	83	....	38	5	2½	5	69	83	121	149	78	130	102
23	FT-40	5000	24	7400	S	Fk	Hyd	Y	10	3	48	.....	24°	89¾	....	42	5	2½	58½	69	83	118	139	99	120	143
24	FTE-50	5000	24	7400	S	Fk	Hyd	Y	10	3	48	.....	24°	89¾	....	42	5	2½	11	69	83	111	139	92	120	143
25	FC-50	5000	24	7400	St	Fk	Hyd	Y	10	3	48	.....	24°	92¼	....	42	5	2½	58½	69	83	118	139	99	120	143
26	FCE-50	5000	24	7500	St	Fk	Hyd	Y	10	3	48	19	24°	89¾	....	42	5	2½	11	69	83	111	139	92	120	143
27	FT-60	6000	24	8000	S	Fk	Hyd	Y	10	3	48	19	24°	91	....	42	5	2½	58½	69	83	118	139	99	120	143
28	FTE-60	6000	24	8000	S	Fk	Hyd	Y	10	3	48	19	24°	91	....	42	5	2½	11	69	83	111	139	92	120	143
29	FC-60	6000	24	8000	St	Fk	Hyd	Y	10	3	48	19	24°	91	....	42	5	2½	58½	69	83	118	139	99	120	143
30	FCE-60	6000	24	8000	St	Fk	Hyd	Y	10	3	48	19	24°	91	....	42	5	2½	11	69	83	111	139	92	120	143
31	JOM-70	7000	24	8400	St	Fk	Hyd	N	12	5	60	17	24°	97	....	42	5	2½	47	....	83	....	83	....	85	101
32	JOMH-70	7000	24	8700	St	Fk	Hyd	Y	12	5	60	17	24°	97	....	42	5	2½	19½	....	83	....	127	....	119	139
33	JOM-70/60	7000	24	9000	St	Fk	Hyd	N	12	5	60	17	30°	97	....	42	5	2½	47	....	83	....	83	....	85	101
34	JOMH-70/60	7000	24	9300	St	Fk	Hyd	Y	12	5	60	17	30°	97	....	42	5	2½	19½	....	83	....	127	....	119	139
35	JOM-80	8000	24	9600	St	Fk	Hyd	N	12	5	66	19½	24°	105¾	....	42	5	2½	47	....	83	....	83	....	60	98
36	JOMH-80	8000	24	9900	St	Fk	Hyd	Y	12	5	66	19½	24°	105¾	....	42	5	2½	29½	....	83	....	117	....	109	145
37	JOM-100	10000	24	10500	St	Fk	Hyd	N	12	5	72	19¾	24°	111¾	....	42	5	2½	47	....	83	....	83	....	80	98
38	JOMH-100	10000	24	10800	St	Fk	Hyd	Y	12	5	72	19¾	24°	111¾	....	42	5	2½	29½	....	83	....	117	....	109	145
39	H5	10000	24	5450	St	Ptf	Hyd	N	....	....	67	.....	....	81½	60	84	3½	3½	60	88	....	88	....	....	83½	11
40	HH5	10000	24	5700	St	Ptf	Hyd	Y	....	....	67	.....	....	81½	60	84	3½	3½	N	88	....	132½	....	....	108	138½
41	Barrett NTF-20-60	2000	24	3535	W	Fk	HE	Y	10	2	32	7⅛	18°	49⅛	30	84	3½	3½	60	83	....	83	....	60	....	83½
42	NTF-20-45	2000	24	3285	W	Fk	HE	Y	10	2	32	7⅛	18°	49⅛	30	84	3½	3½	45	68	....	68	....	45	....	68½
43	TTF-20-S-60	2000	24	3620	W	Fk	HE	Y	10	2	32	7⅛	18°	49⅛	30	84	3½	3½	60	83	....	83	....	60	....	83½
44	TTF-2-S-45	2000	24	3370	W	Fk	HE	Y	10	2	32	7⅛	18°	49⅛	30	84	3½	3½	45	68	....	68	....	45	....	68½
45	TTF-20-T-90	2000	24	3630	W	Fk	HE	Y	10	2	32	7⅛	18°	49⅛	30	84	3½	3½	45	68	....	....	113	....	90	113½
46	TTF-20-T-120	2000	24	3880	W	Fk	HE	Y	10	2	32	7⅛	18°	49⅛	30	84	3½	3½	60	83	....	....	143	....	120	143¼
47	Buda FB20-15	2000	15	3489	S	Fk	Hyd	Y	10	5	38	11½	15	62¾	30	....	7	....	24°	80	113	64½	190½	42	188	108½
48	FPB20-15	2000	15	3489	S	Fk	Hyd	Y	10	5	38	13¼	15	66¾	30	....	8¼	....	24°	80	113	64½	190½	42	188	108½
49	FPB20-24	2000	15	4104	S	Fk	Hyd	Y	10	5	38	11½	24	62¾	30	....	7	....	24°	80	113	64½	190½	42	188	108½
50	FPB20-24	2000	15	4104	S	Fk	Hyd	Y	10	5	38	13¼	24	66¾	30	....	8¼	....	24°	80	113	64½	190½	42	188	108½
51	FT30-15	3000	24	4890	S	Fk	Hyd	Y	10	5	40	11¾	15	74¾	30	....	5¾	....	24°	80	113	69½	194½	42	188	110
52	FTD30-15	3000	24	4970	S	Fk	Hyd	Y	10	5	40	11¾	15	74¾	30	....	5¾	....	24°	80	113	69½	194½	42	188	110
53	FT30-24	3000	24	5768	S	Fk	Hyd	Y	10	5	40	12	24	76¼	30	....	5¾	....	24°	80	113	69½	194½	42	188	110
54	FTD30-24	3000	24	5858	S	Fk	Hyd	Y	10	5	40	12	24	76¼	30	....	5¾	....	24°	80	113	69½	194½	42	188	110
55	FT40-18	4000	24	5948	S	Fk	Hyd	Y	10	5	40	12	18	76¼	36	....	5¾	....	24°	80	113	69½	194½	42	188	110
56	FTD40-18	4000	24	6038	S	Fk	Hyd	Y	10	5	40	12	18	76¼	36	....	5¾	....	24°	80	113	69½	194½	42	188	110
57	FT40-24	4000	24	6278	S	Fk	Hyd	Y	10	5	45	12	24	81¼	36	....	6¼	....	24°	80	113	69½	194½	42	188	110
58	FTD40-24	4000	24	6368	S	Fk	Hyd	Y	10	5	45	12	24	81¼	36	....	6¼	....	24°	80	113	69½	194½	42	188	110
59	FTP40-24	4000	24	.....	S	Fk	Hyd	Y	....	....	....	.....	24	....	....	....	....	....	....	....	....	....	....	....	....	....
60	FTPD40-24	4000	24	.....	S	Fk	Hyd	Y	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
61	FT50-24	5000	24	7704	S	Fk	Hyd	Y	10	5	50	14½	24	88	36	....	6¾	....	16½°	50	113	74½	208½	42	188	118½
62	FTD50-24	5000	24	7824	S	Fk	Hyd	S	10	5	50	14½	24	88	36	....	6¾	....	16½°	50	113	74½	208½	42	188	118½
63	FT60-24	6000	24	8847	S	Fk	Hyd	Y	10	5	55	14¾	24	93	42	....	6¾	....	16½°	50	113	74½	208½	42	188	118½
64	FTD60-24	6000	24	8997	S	Fk	Hyd	Y	10	5	55	14¾	24	93	42	....	6¾	....	16½°	50	113	74½	208½	42	188	118½
65	FT75-24	7500	24	9531	S	Fk	Hyd	Y	10	5	60	14¾	24	100½	42	....	8¼	....	8½°	50	113	74½	208½	42	188	118½
66	FTD75-24	7500	24	9681	S	Fk	Hyd	Y	10	5	60	14¾	24	100½	42	....	8¼	....	8½°	50	113	74½	208½	42	188	118½
67	Dual FTP60-24	6000	24	9250	S	Fk	Hyd	Y	10	5	65	20	24	104¾	42	....	9	....	16½°	50	113	74½	208½	42	188	118½
68	Dual FTPD60-24	6000	24	9400	S	Fk	Hyd	Y	10	5	65	20	24	104¾	42	....	9	....	16½°	50	113	74½	208½	42	188	118½
69	Champ 600	5000	20	9400	S	Fk	HC	Y	14	6	73	24	20°	135	43	60	18	7	5	138½	144	234½	248	192	....	228
70	700	5000	20	10200	S	Fk	HC	Y	14	6	73	24	20°	135	43	60	15	7	5	161	162	281	282	240	....	276
71	Clark ETR-1024	1000	24	1615	S	Fk	Hyd	Y	10	3	30½	10⅝	38°	53¼	30†	....	5	2¾	6¾	56	84	93	149	74	130	....
72	ECE-2024	2000	24	3650	S	Fk	Hyd	Y	10	3	37	12¼	40°	63½	30†	....	3½	2⅝	6¾	57	87	90½	150½	72	132	....
73	ECL-3024	4000	15	6040	S	Fk	Hyd	Y	10	3	44	14¾	40°	74¾	38†	....	4¾	2⅝	6¾	58	102	93½	177½	72	158	....
74	ECL-4024	4000	24	5860	S	Fk	Hyd	Y	10	3	48	14¾	40°	77¼	38†	....	4¾	2½	6¾	58	102	93½	177½	72	158	....
75	ECL-5024	5000	24	6833	S	Fk	Hyd	Y	10	3	48	14¾	40°	79¼	38†	....	4¾	2½	6¾	58	102	93½	177½	72	158	....
76	UT-6024	7000	18	8073	S	Fk	Hyd	Y	10	3	54	15½	48°	87	42†	....	4¾	2⅝	25	60	117	93½	203½	72	180	....
77	UT-7024	7000	24	9853	S	Fk	Hyd	Y	10	3	54	15½	48°	89	42†	....	4¾	2⅝	25	60	117	93½	203½	72	180	....
78	TR-1024	1000	24	2605	S	Fk	Hyd	Y	10	3	30½	12½	38°	56½	30†	....	5¾	2¾	60¾	66	78½	120¾	147¾	103	130	....

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Truck Forward (mph)	Truck Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
89	4	60	110	Own.....1653	4½	(5)	300	.....	3	3	.....	5.7	5.7	44	45	Y	15x3½	10x4	N	.....	1
89	4	60	110	Own.....1653	4½	(5)	300	.....	3	3	.....	5.7	5.7	44	45	Y	15x3½	10x4	N	.....	2
89	4	60	110	Own.....1653	4½	(5)	300	.....	3	3	.....	5.5	5.5	40	45	Y	15x3½	10x4	N	.....	3
89	4	60	110	Own.....1653	4½	(5)	300	.....	3	3	.....	5.5	5.5	40	45	Y	15x3½	10x4	N	.....	4
88½	4	61	111	Own.....1653	4½	(5)	300	.....	3	3	.....	5.5	5.5	40	45	Y	15x3½	8½x4	N	.....	5
88½	4	61	111	Own.....1653	4½	(5)	300	.....	3	3	.....	5.5	5.5	40	45	Y	15x3½	8½x4	N	.....	6
85	5	73	120	Own.....1653	4½	(4)	(8)	.....	5	5	.....	5.5	5.5	27	38	Y	17¾x5	10½x5	N	.....	7
85	5	73	120	Own.....1653	4½	(4)	(8)	.....	5	5	.....	5.5	5.5	25	38	Y	17¾x5	10½x5	N	.....	8
85	5	74	121	Own.....1653	4½	(4)	(8)	.....	5	5	.....	5.5	5.5	25	37	Y	17¾x6	10½x5	N	.....	9
85	5	74	121	Own.....1653	4½	(4)	(8)	.....	5	5	.....	5.5	5.5	25	37	Y	17¾x6	10½x5	N	.....	10
88	5	70	126	Own.....1860	7	(4)	400	.....	5	5	.....	5.7	5.7	30	40	Y	22x6	18¼x5	N	.....	11
88	5	70	126	Own.....1860	7	(4)	400	.....	5	5	.....	5.7	5.7	30	40	Y	22x6	18¼x5	N	.....	12
71½	5	72	128	Own.....1860	7	(4)	400	.....	5	5	.....	5.7	5.7	30	40	Y	22x6	18¼x5	N	.....	13
71½	5	72	128	Own.....1860	7	(4)	400	.....	5	5	.....	5.7	5.7	30	40	Y	22x6	18¼x5	N	.....	14
73	5	72	130	Own.....1860	7	(4)	400	.....	5	5	.....	5.7	5.7	30	40	Y	22x6	18¼x5	N	.....	15
73	5	72	130	Own.....1860	7	(4)	400	.....	5	5	.....	5.7	5.7	30	40	Y	22x6	18¼x5	N	.....	16
74	6	74	131	Own.....1860	7	(4)	450	.....	5	5	.....	5.3	5.3	28	40	Y	22x7	18¼x5	N	.....	17
74	6	74	131	Own.....1860	7	(4)	450	.....	5	5	.....	5.3	5.3	28	40	Y	22x7	18¼x5	N	.....	18
74	6	74	131	Own.....1860	7	(4)	450	.....	5	5	.....	5.3	5.3	28	40	Y	22x7	18¼x5	N	.....	19
74	6	74	131	Own.....1860	7	(4)	450	.....	5	5	.....	5.3	5.3	28	40	Y	22x7	18¼x5	N	.....	20
78	8	76	134	(7)	(8)	.....	.....	Ele	5	5	.....	8.0	8.0	28	40	Y	22x7	18¼x5	N	.....	21
78	8	76	134	(7)	(8)	.....	.....	Ele	5	5	.....	8.0	8.0	28	40	Y	22x7	18¼x5	N	.....	22
89	8	74	138	Own.....1860	7	(4)	500	.....	5	5	.....	5.0	5.0	20	40	Y	22x8	15x6	N	.....	23
89	8	74	138	Own.....1860	7	(4)	500	.....	5	5	.....	5.0	5.0	20	40	Y	22x8	15x6	N	.....	24
81	8	75	141	Own.....1860	7	(4)	500	.....	5	5	.....	5.0	5.0	20	40	Y	22x8	15x6	N	.....	25
81	8	75	141	Own.....1860	7	(4)	500	.....	5	5	.....	.....	.....	20	40	Y	22x8	15x6	N	.....	26
81	8	77	141	Own.....1860	7	(4)	550	.....	5	5	.....	5.0	5.0	17	35	Y	22x8	15x6	N	.....	27
81	8	77	141	Own.....1860	7	(4)	550	.....	5	5	.....	5.0	5.0	17	35	Y	22x8	15x6	N	.....	28
81	8	77	141	Own.....1860	7	(4)	550	.....	5	5	.....	5.0	5.0	17	35	Y	22x8	15x6	N	.....	29
81	8	77	141	Own.....1860	7	(4)	550	.....	5	5	.....	5.0	5.0	17	35	Y	22x8	15x6	N	.....	30
99	20	80	156	Own.....2460	8	(9)	600	.....	5	5	.....	5.7	5.7	33	35	Y	22x10	15x8	N	.....	31
99	20	80	156	Own.....2460	8	(9)	600	.....	5	5	.....	5.7	5.7	33	35	Y	22x10	15x8	N	.....	32
99	20	80	156	Own.....2460	8	(9)	600	.....	5	5	.....	5.7	5.7	33	35	Y	22x10	15x8	N	.....	33
99	20	80	156	Own.....2460	8	(9)	600	.....	5	5	.....	5.7	5.7	33	35	Y	22x10	15x8	N	.....	34
105	22	85	165	Own.....2460	8	(9)	660	.....	5	5	.....	5.2	5.2	31	35	Y	22x12	15x8	N	.....	35
105	22	85	165	Own.....2460	8	(9)	660	.....	5	5	.....	5.2	5.2	31	35	Y	22x12	15x8	N	.....	36
114	24	92	174	Own.....2460	8	48	660	.....	5	5	.....	5.2	5.2	20	35	Y	22x12	15x8	N	.....	37
114	24	92	174	Own.....2460	8	48	660	.....	5	5	.....	5.2	5.2	20	35	Y	22x12	15x8	N	.....	38
91	56	75	177	Own.....2460	8	36	500	.....	5	5	.....	4.2	4.2	20	60	Y	20x6	4x10x6	N	.....	39
116½	56	75	177	Own.....2460	8	36	500	.....	5	5	.....	4.2	4.2	20	60	Y	20x6	4x10x6	N	.....	40
45	49½	65¼	100	Own.....	1	12	(10)	.....	2	2	.....	2.0	2.0	10	15	Y	10x5	10x6	N	.....	41
45	49½	65¼	100	Own.....	1	12	(10)	.....	2	2	.....	2.0	2.0	10	15	Y	10x5	10x6	N	.....	42
45	49½	65¼	100	Own.....	1	12	(10)	.....	2	2	.....	2.0	2.0	10	15	Y	10x5	10x6	N	.....	43
45	49½	65¼	100	Own.....	1	12	(10)	.....	2	2	.....	2.0	2.0	10	15	Y	10x5	10x6	N	.....	44
45	49½	65¼	100	Own.....	1	12	(10)	.....	2	2	.....	2.0	2.0	10	15	Y	10x5	10x6	N	.....	45
45	49½	65¼	100	Own.....	1	12	(10)	.....	2	2	.....	2.0	2.0	10	15	Y	10x5	10x6	N	.....	46
106½	62¼	101¼	53¾	122¼	Wau...ICK-135-B	18	.....	.....	Conv	2	2	Fr	5.8	5.8	44	.....	N	17x5x12½	14x4x10	Y	.....	47
106½	69½	161¼	56¼	130⅞	Wau...ICK-135-B	18	.....	.....	Conv	2	2	Fr	7.0	7.0	44	.....	N	6.00/9	5.00/8	Y	.....	48
106½	62¾	101¼	53¾	122¼	Wau...ICK-135-B	18	.....	.....	Conv	2	2	Fr	5.8	5.9	44	.....	N	17x5x12½	14x4x10	Y	.....	49
106½	69½	161¼	56¼	130⅞	Wau...ICK-135-B	18	.....	.....	Conv	2	2	Fr	7.0	7.0	44	.....	N	6.00/9	5.00/8	Y	.....	50
110	70	7	60½	82[A]	Buda.....4B-153	49	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x6x12½	15x4x11¼	Y	.....	51
110	70	7	60½	82[A]	Buda.....4BD-153	40½	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x6x12½	15x4x11¼	Y	.....	52
110	72	7	63½	84[A]	Buda.....4B-153	49	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x6x12½	15x4x11¼	Y	.....	53
110	72	7	63½	84[A]	Buda.....4BD-153	40½	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x6x12½	15x4x11¼	Y	.....	54
110	72	7	63½	84[A]	Buda.....4B-153	49	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x7x12½	15x5x11¼	Y	.....	55
110	72	7	63½	84[A]	Buda.....4BD-153	40½	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x7x12½	15x5x11¼	Y	.....	56
110	77½	8½	65½	89½[A]	Buda.....4B-153	49	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x7x12½	15x5x11¼	Y	.....	57
110	77½	8½	65½	89½[A]	Buda.....4BD-153	40½	.....	.....	Conv	2	2	Fr	6.6	6.6	45	.....	N	17x7x12½	15x5x11¼	Y	.....	58
.....	.....	.....	.....	.....	Buda.....4B-153	49	.....	.....	Conv	2	2	Fr	.....	.....	.....	.....	N	.....	.....	Y	.....	59
.....	.....	.....	.....	.....	Buda.....4BD-153	40½	.....	.....	Conv	2	2	Fr	.....	.....	.....	.....	N	.....	.....	Y	.....	60
116½	82¼	71½	71	96¼[A]	Buda.....4B-182	53½	.....	.....	Conv	2	2	Fr	6.8	6.8	45	.....	N	20x7x16	15x5x11¼	Y	.....	61
116½	82½	71½	71	96½[A]	Buda.....4BD-182	48½	.....	.....	Conv	2	2	Fr	6.8	6.8	45	.....	N	20x7x16	15x5x11¼	Y	.....	62
116½	88	91½	74⅝	102[A]	Buda.....6B-230	78	.....	.....	Conv	2	2	Fr	6.8	6.8	45	.....	N	20x8x16	15x6x11¼	Y	.....	63
116½	88	91½	74⅝	102[A]	Buda.....6BD-230	60	.....	.....	Conv	2	2	Fr	6.8	6.8	45	.....	N	20x8x16	15x6x11¼	Y	.....	64
116½	96⅛	139¾	76¾	111[A]	Buda.....6B-230	78	.....	.....	Conv	2	2	Fr	6.8	6.8	45	.....	N	20x9x16	15x6x11¼	Y	.....	65
116½	96⅛	139¾	76¾	111[A]	Buda.....6BD-230	60	.....	.....	Conv	2	2	Fr	6.8	6.8	45	.....	N	20x9x16	15x6x11¼	Y	.....	66
116½	111	20	91	131[A]	Buda.....6B-230	78	.....	.....	Conv	2	2	Fr	8.5	9.0	45	.....	N	7.50/15	7.50/10	Y	.....	67
116½	111	20	91	131[A]	Buda.....6BD-230	60	.....	.....	Conv	2	2	Fr	8.5	9.0	45	.....	N	7.50/15	7.50/10	Y	.....	68
228	.....	.....	.....	.....	Chry.....IND-16A	.....	.....	.....	Conv	4	1	Ff	30.0	5.0	.....	.....	N	.....	8.25/15	Y	.....	69
270	.....	.....	.....	.....	Int.....BD-269	100	.....	.....	Conv	4	4	Fr	35.0	35.0	.....	.....	N	.....	8.25/15	Y	28000	70
58	.....	51½	68⅝	General Electric	.....	.....	.....	.....	3	3	Ele	6.5	6.5	24	76½	Y	16¼x4x11½	13x3½x8¼	Y	.....	71
62	.....	57	73¾	General Electric	.....	.....	.....	.....	4	4	Ele	6.5	6.5	39	93	Y	16¼x6x11¼	13x4½x8	Y	.....	72
69	.....	63½	83¾	General Electric	.....	.....	.....	.....	4	4	Ele	6.5	6.5	21	80½	Y	21x6x15	15½x5x10	Y	.....	73
78	.....	68¼	92¾	Allis Chalmers	.....	.....	.....	.....	4	4	Ele	6.7	6.7	28	106½	Y	21x7x15	15½x6x10	Y	.....	74
78	.....	68¼	92¾	Allis Chalmers	.....	.....	.....	.....	4	4	Ele	6.7	6.7	24	93	Y	21x8x15	15½x6x10	Y	.....	75
84	.....	75½	99½	Allis Chalmers	.....	.....	.....	.....	4	4	Ele	6.2	6.2	21½	147½	Y	22x9x16	15½x6x10	Y	.....	76
86	.....	78	101½	Allis Chalmers	.....	.....	.....	.....	4	4	Ele	6.2	6.2	19½	159½	Y	22x9x16	18½x6x10	Y	.....	77
57	.....	49	67⅝	Cont.....N-62	14	.....	.....	Conv	1	1	Fr	5.0	4.5	40	.....	N	16¼x4x11½	13x3½x8¼	Y	.....	78

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (in.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	OVERALL DIMENSIONS: Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Length: Load Center (In.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Height: Overall—Including Carriage or Backguard
1	Clark—(Continued) CE-2024	2000	24	4380	S	Fk	Hyd	Y	10	3	36	13⅜	40•	67¼	30†	...	3⅞	3	64	66½	83	115⅝	148¾	97	130	.....
2	CL-3024	3000	24	6750	S	Fk	Hyd	Y	10	3	40	15½	40•	73⅝	36†	...	4¾	2¾	62	68	83	121	193	100	172	.....
3	CL-4024	4000	24	7240	S	Fk	Hyd	Y	10	3	48	15½	40•	80½	36†	...	4¾	2¾	62	68	83	121	193	100	172	.....
4	CL-5024	5000	24	8320	S	Fk	Hyd	Y	10	3	48	15½	40•	83½	36†	...	4¾	2¾	62	68	83	121	193	100	172	.....
5	UT-6024	7000	18	9750	S	Fk	Hyd	Y	10	3	54	15½	45•	88	42†	...	4¾	2¾	25	60	117	95½	203½	72	180	.....
6	UT-7024	8000	18	10450	S	Fk	Hyd	Y	10	3	54	15½	45•	89¼	42†	...	4¾	2¾	25	60	117	95½	203½	72	180	.....
7	UT-100	10000	24	12860	S	Fk	Hyd	Y	10	3	66	17	45•	108	42†	...	6¼	2½	7	70	116	102¾	194¾	72	164	.....
8	Y-20	2000	24	4000	S	Fk	Hyd	Y	10	3	40	14¼	40•	72⅝	30†	...	6	5	67⅛	60	90	93	153	72	132	.....
9	Y-40	4400	15	6570	S	Fk	Hyd	Y	10	3	55	17⅝	40•	94¼	36†	...	7½	5	61½	61½	98½	94½	166½	72	144	.....
10	Y-60	6500	15	9870	S	Fk	Hyd	Y	10	3	70	20¼	40•	111	42†	...	9¾	4⅝	63¼	65	115	98¼	194¼	72	168	.....
11	Y-100	10000	24	14145	S	Fk	Hyd	Y	12	4	86	23	49•	133¾	48†	...	9¾	4¼	.....	81	150	118	244	84	210	.....
12	Y-150	15000	24	18330	S	Fk	Hyd	Y	12	4	100	27½	54•	170½	48†	...	15½	6½	.....	89	152	129¾	255¾	84	210	.....
13	Crescent JCL-1-15	1000	15	2120	S	Fk	Hyd	Y	10	3	36⅛	12⅜	15	60¼	...	...	6	4	29	68	83	108	137	91	120	137
14	JCL-1	...	...	2445	S	Fk	Hyd	Y	10	3	36⅛	13⅜	24	64¼	...	...	6	4	29	68	83	108	137	91	120	137
15	JCL-1.5	...	...	2975	S	Fk	Hyd	Y	10	3	36	14⅜	24	65¼	...	...	6	4	29	68	83	108	137	91	120	137
16	JCH-2	2000	15	.....	S	Fk	Hyd	Y	10	5	39	11⅜	24	63	...	...	6	4	66	68	83	108	138	90	130	138
17	JCH-3	3000	24	.....	S	Fk	Hyd	Y	10	5	38½	...	24	65½	...	...	4	3	64⅝	68	83	123	153	100	130	153
18	JEH-1	1000	15	.....	St	Fk	Hyd	Y	5	3	34½	11	24	53	...	...	3	3	66	68	83	107	137	90	120	137
19	JEH-2-18	2000	15	.....	St	Fk	Hyd	Y	5	3	34½	11½	18	55½	...	...	3	3	66	68	83	107	137	90	130	137
20	JEH-2	2000	15	.....	St	Fk	Hyd	Y	5	3	34½	11½	24	57½	...	...	3	3	66	68	83	107	137	90	130	137
21	JEH-3	3000	24	.....	St	Fk	Hyd	Y	5	3	42	13⅜	24	64½	...	...	4	3	64½	68	83	122	152	100	130	152
22	MEH-4	4000	24	.....	St	Fk	Hyd	Y	5	3	42	15½	24	68¼	...	...	4	3	63⅝	68	83	122	152	100	130	152
23	MCH-4	4000	24	.....	S	Fk	Hyd	Y	10	5	40	15⅜	24	71½	...	...	4	3	63⅝	68	83	123	153	100	130	153
24	MCH-5	5000	24	.....	S	Fk	Hyd	Y	10	5	41	16⅜	24	76⅜	...	...	4	3	64	68	83	122½	152½	100	130	152½
25	MCH-6	6000	24	.....	S	Fk	Hyd	Y	10	5	44	16⅜	24	82¾	...	...	4	3	64	68	83	122½	146½	100	124	146½
26	MCL-7	7000	24	.....	S	Fk	Hyd	Y	10	5	55	18½	24	94½	...	...	5	4	7¼	...	83	...	142½	...	120	142½
27	MCL-8	8000	24	.....	S	Fk	Hyd	Y	10	5	55	18½	24	94½	...	...	5	4	7¼	...	83	...	142½	...	120	142½
28	Elwell-Parker F-26T2	2000	15	5000‡	S	Fk	Hyd	Y	10	5	40	14⅜	24	67⅝	36	48	3¼	...	17	83	...	...	148	...	130	149
29	F-26T2	2000	15	4800‡	S	Fk	Hyd	Y	10	5	40	14⅜	24	67⅝	36	48	3¼	...	50	68	...	...	118	...	100	119
30	F-38T	2000	20	4985‡	St	Fk	Hyd	Y	10	5	43½	10¼	20	63	30	36	5	...	50	68	...	...	118	...	100	119
31	F-30T3	3000	24	7300‡	S	Fk	Hyd	Y	12	5	42	12	24	73¼	36	48	8	...	17	83	...	...	147	...	130	149
32	F-30T3	3000	24	7000‡	S	Fk	Hyd	Y	12	5	42	12	24	73¼	36	48	8	...	50	68	...	...	118	...	100	120
33	F-30T4	4000	24	7600‡	S	Fk	Hyd	Y	12	5	46	13⅜	24•	78¼	36	48	7	...	17	83	...	...	147	...	130	149
34	F-30T4	4000	24	7400‡	S	Fk	Hyd	Y	12	5	46	13⅜	24•	78¼	36	48	7	...	50	68	...	...	117	...	100	119
35	F-31T6	6000	24	9900‡	S	Fk	Hyd	Y	12	5	48	14⅜	24•	82¾	36	48	6½	...	17	86	...	...	145	...	126	147
36	F-31T6	6000	24	9650‡	S	Fk	Hyd	Y	12	5	48	14⅜	24•	82¾	36	48	6½	...	50	68	...	...	117	...	96	119
37	F-31T7	7000	24	10565‡	S	Fk	Hyd	Y	12	5	54	14⅜	24•	88¾	36	48	6½	...	17	83	...	...	145	...	96	147
38	F-39T8	8000	24	10000‡	S	Fk	Hyd	Y	12	5	54	18	24•	94	36	48	9½	...	17	...	83	...	140	116	...	152
39	F-39T10	10000	24	13300‡	S	Fk	Hyd	Y	12	5	61	19	24•	98	36	48	8	...	17	...	83	...	137	110	...	146
40	F-25T	10000	24	15000‡	St	Fk	Ch	Y	12	3	60	17	24•	102	36	48	4½	...	67	...	95	...	151	124	...	152
41	F-5	12000	36	13500‡	St	FR	Ch	Y	10	3	72	17	30•	111	...	60	4½	...	55	...	...	...	95	55	73	95
42	F-6	15000	36	22600‡	St	Fkr	Ch	Y	10	3	72	17	36•	117	...	72	4½	...	57	...	96	...	96	57	75	96
43	F-6	16000	36	24900‡	St	Fkr	Ch	Y	10	3	72	17	39•	145	...	78	4½	...	53	...	96	96	...	53	71	96
44	F-22-20	20000	36	34500	St	R	Hyd	Y	N	N	91	18	36•	137	...	72	4	...	115	...	144	144	...	115	115	144
45	F-22-30	30000	SA	35650	St	R	Hyd	Y	N	N	100	24	36•	149	...	72	4	...	93	...	144	144	...	93	93	144
46	F-44-40	40000	SA	57600	St	R	Hyd	Y	N	N	110	27½	39•	172½	...	78	5	...	89½	...	144	144	...	89½	89½	144
47	F-44-50	50000	SA	61700	St	R	Hyd	Y	N	N	110	28½	42•	173½	...	84	5	...	83½	...	144	144	...	83½	83½	144
48	F-44-60	60000	SA	74730	St	R	Hyd	Y	N	N	110	29½	45•	174½	...	90	5	...	77½	...	144	144	...	77½	77½	144
49	E-11	4000	24	3300	St	Ptf	Ch	N	N	N	.....	.....	.....	97¼	41	60	1½	2½	64	83	.....	.....	.....	.....	64	.....
50	E-11-T	4000	24	3725	St	Ptf	Ch	Y	N	N	.....	.....	.....	97¼	41	60	1½	2½	65½	83	.....	.....	141¾	.....	124	.....
51	E-2	4000	24	3700	St	Ptf	Ch	N	N	N	.....	.....	.....	119¼	54	72	...	4¾	62½	83	.....	.....	.....	.....	62½	.....
52	E-2-T	4000	24	4400	St	Ptf	Ch	Y	N	N	.....	.....	.....	119¼	54	72	...	4¾	63½	83	.....	.....	133½	.....	114	.....
53	ELN-6	6000	24	4750	St	Ptf	Ch	Y	N	N	.....	.....	.....	125¼	54	84	.....	.....	62	83	.....	.....	.....	.....	62	.....
54	ELN-6-T	6000	24	5500	St	Ptf	Ch	Y	N	N	.....	.....	.....	125¼	54	84	.....	.....	62⅝	83	.....	.....	133⅝	113	.....	.....
55	ELN-10	10000	24	6000	St	Ptf	Ch	Y	N	N	.....	.....	.....	136¼	60	108	.....	.....	69½	95	.....	.....	.....	69½	.....	.....
56	ELN-10-T	10000	24	8200	St	Ptf	Ch	Y	N	N	.....	.....	.....	136¼	60	108	.....	.....	70	95	.....	.....	142¾	118	.....	.....
57	ELN-16	16000	36	8500	St	Ptf	Ch	N	N	N	.....	.....	.....	139⅝	60	.....	.....	.....	57	95	.....	.....	95	57	.....	.....
58	ELN-20	20000	36	9900	St	Ptf	Ch	N	N	N	.....	.....	.....	141¾	62	.....	.....	.....	57	95	.....	.....	95	57	.....	.....
59	ELN-30	30000	SA	13500	St	Ptf	Ch	N	N	N	82	.....	.....	157¼	72	.....	4½	.....	57	107	.....	107	.....	57	.....	107
60	ELB-50	50000	SA	20000	St	Ptf	Ch	N	N	N	75	.....	.....	158⅞	72	.....	4½	.....	51	102	.....	102	.....	51	.....	102
61	Gerlinger S-16	16000	28	.....	S	Fk	Hyd	Y	9	6	106	24	...	156	48	96	13½	11½	N	102½	165½	147½	273½	96	222	296
62	L-16	16000	27	.....	S	Fk	Hyd	Y	8	7	130	28½	...	191	48	96	13½	10⅝	N	102	234	148¼	412¼	96	360	434
63	Hyster ON-20	1000	...	3020	S	Fk	Hyd	Y	11	3	45	14¼	24	71	24	48	3¼	3⅝	2	61	88	96	150	72	126	150
64	ON-20	2000	24	3620	S	Fk	Hyd	Y	11	3	45	14¼	15	71	24	48	3¼	3⅝	2	61	88	96	150	72	126	150
65	ON-20	2000	24	3980	S	Fk	Hyd	Y	11	3	45	14¼	24	73¼	24	48	3¼	3⅝	2	61	88	96	150	72	126	150
66	UC-30	3000	...	5705	S	Fk	Hyd	Y	10	5	50	12	24	74⅝	30	60	5½	2¼	30	70½	100½	106½	168½	84	144	168½
67	YC-40	4000	...	6305	S	Fk	Hyd	Y	10	5	50	12	24	78¾	30	60	5½	2¼	30	70½	100½	106½	168½	84	144	168½
68	YT-40	4000	...	5900	S	Fk	Hyd	Y	10	4	56	16	15	86	30	54	4½	3½	10	65	101	96	168	72	144	168
69	XA-60	6000	...	10530	S	Fk	Hyd	Y	11	5	65	21	24	106⅜	42	84	6	4½	5	64	113½	97½	193½	72	168	193¾
70	ZA-80	8000	...	11685	S	Fk	Hyd	Y	12	4	76	21	24	117⅜	42	84	6	6¼	5	65½	115	99	195	72	168	195
71	RT-100	10000	...	13600	S	Fk	Hyd	Y	10	6	86	23	24	148	42	108	8	5½	0	95	190	144	334	98	288	344½
72	RC-150	15000	...	19250	S	Fk	Hyd	Y	10	6	100	25¼	24	153¾	42	108	12	7½	0	97	192	146	336	98	288	336
73	RC-160	16000	...	19730	S	Fk	Hyd	Y	10	6	100	25¼	24	157¼	42	108	12	7½	0	97	192	146	336	98	288	336
74	SC-180	18000	...	20900	S	Fk	Hyd	Y	10	6	100	25¼	24	158	42	108	12	7½	0	97	192	146	336	98	288	336
75	Kwik Mix Moto-Bug 3A	1000	15	1500	St	Fk	Hyd	Y	5	0	34⅜	12½	15•	68	20	30	6	3	12	66	66	84	84	.....	60	84

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
85		56	77¼	Cont T-91	22½			Conv	2	2	Fr	8.2	7.1	41		N	16¼x6x11¼	13x4½x8	Y		1
71½		65	86⅛	Cont F-4124	31½			CA	2	2	FE	7.0	6.0	42		N	21x6x15	15½x6x10	Y		2
78		68	92⅝	Cont F-4124	31½			CA	2	2	FE	7.0	6.0	40		N	21x7x15	15½x6x10	Y		3
81½		70	96⅛	Cont F-4124	31½			CA	2	2	FE	7.0	6.0	38		N	21x8x15	15½x6x10	Y		4
85		74½	100½	Cont F-6209	50			CA	2	2	FE	7.3	6.3	35			22x9x16	15½x6x10	Y		5
88		75½	101½	Cont F-6209	50			CA	2	2	FE	7.3	6.3	35			22x9x16	15½x6x10	Y		6
105		87½	122	Cont F-6209	50			Aut	2	2	Ele	6.0	6.0	26		Y	22x12x16	17x7x12⅛	Y		7
71⅛		59	85⅛	Cont Y-91	22½			Conv	1	1	Fr	8.5	7.3	46		N	6.00/9	5.00/8	Y		8
85½		73	103⅛	Cont F-4124	31½			Conv	3	3	Fr	10.2	10.2	40		N	7.00/12	6.00/9	Y		9
114		94	134¼	Cont F-6209	50			Conv	3	3	Fr	11.5	11.5	35		N	7.50/15	7.50/10	Y		10
135½		116	158½	Cont F-6209	55			Conv	4	4	Fr	18.0	18.0	26¾		N	8.25/18	7.50/15	Y		11
165		136	192½	Her QXLD-3	82½			Conv	4	4	Fr	23.7	21.4	42½		N	8.25/20	8.25/15	Y		12
61■		54■	97⅜■	Kimble		32	204		4	4		5.0	5.0	30	40	Y					13
61■		54■	98¼■	Kimble		32	204		4	4		5.0	5.0	30	40	Y					14
62■		54■	108¾■	Kimble		32	350		4	4		5.0	5.0	25	40	Y					15
63■		57■	120■	Kimble		32	350		4	4		5.5	5.5	30	35	Y					16
63■		64■	126■	Kimble		32			4	4		5.5	5.5	30	35	Y					17
45■		49■	102■	Kimble		32			4	4		4.5	4.5	34	40	Y					18
50■		52■	104■	Kimble		32			4	4		4.5	4.5	32	40	Y					19
52■		53■	106■	Kimble		32			4	4		4.5	4.5	32	40	Y					20
58■		58■	114■	Kimble		32			4	4		4.5	4.5	30	30	Y					21
60■		62■	118■	Kimble		32	500		4	4		4.5	4.5	24	30	Y					22
70■		65■	130■	Kimble		36			4	4		5.0	5.0	25	35	Y					23
70■		68■	136■	Kimble		36			4	4		5.0	5.0	24	40	Y					24
83■		70■	144■	Kimble		36			4	4		5.0	5.0	22	40	Y					25
88■		76■		Kimble		36			4	4		6.0	6.0			Y					26
88■		76■		Kimble		36			4	4		6.0	6.0			Y					27
67	8	58	111⅜	Own		30	(11)	N	4	4		6.0	6.0	29	40	Y	15½x5	10½x5	Y		28
67	8	58	111⅜	Own		30	(11)	N	4	4		6.0	6.0	29	40	Y	15½x5	10½x5	Y		29
57	0	54	99	Own		30	450	N	4	4		6.0	6.0	29	40	Y	16¼x5	9x5	N		30
84	9	68	129	Own		36	(12)	N	4	4		6.0	6.0	28	45	Y	22x6	15½x5	Y		31
84	9	68	129	Own		36	(12)	N	4	4		6.0	6.0	28	45	Y	22x6	15½x5	Y		32
83	10	70	134⅜	Own		36	(13)		4	4		5.5	5.5	25	45	Y	22x7	15½x5	Y		33
83	10	70	134⅜	Own		36	(13)		4	4		5.5	5.5	25	45	Y	22x7	15½x5	Y		34
87	11	72	139¾	Own		36	(14)		4	4		5.0	5.0	20	40	Y	22x8	15½x6	Y		35
87	11	72	139¾	Own		36	(14)		4	4		5.0	5.0	20	40	Y	22x8	15½x6	Y		36
91	13	76	143¾	Own		36	(14)		4	4		5.0	5.0	20	40	Y	22x8	15½x6	Y		37
95	9	80	154	Own		48	(15)					4.0	4.0	17	35	Y	22x10	17x6	Y		38
99	10	83	158	Own		48	(16)					4.0	4.0	15	35	Y	22x12	17x7	Y		39
129	39	92	162	Own		48	(16)					3.5	3.5	10	15	Y	22¾x12	15x8	Y		40
113	19	92	185	Own		60	(17)					4.0	4.0	8	12	Y	22x14	15x6	Y		41
118	16	100	195	Own		60	800					5.0	5.0	9	15	Y	22x16	4x18x7	Y		42
126	21	103	207	Own		60	900					5.0	5.0	9	15	Y	22x16	4x18x7	Y		43
161	29	123	228	Own		(1)						4.0	4.0	8½	57	Y	4x22¾x14	4x20x8	Y		44
175	31	133	246½	Own		(1)						3.3	3.3	8½	57	Y	4x36x14	4x22¾x8	Y		45
197	29	162	284½	Own		(1)						3.0	3.0	8	40	Y	4x36x20	2x36x16	Y		46
197	26	165	285½	Own		(1)						3.0	3.0	8	40	Y	4x36x22	2x36x18	Y		47
197	22	169	286½	Own		(1)						3.0	3.0	8	40	Y	4x36x24	2x36x20	Y		48
88	46	52	131	Own		(18)			4	4		4.0	4.0	14	25	Y	15x5	4x6½x2½	N		49
88	46	52	131	Own		(18)			4	4		4.0	4.0	14	25	Y	15x5	4x6½x2½	N		50
94	38	63	147	Own		(19)			4	4		5.0	5.0	12	20	Y	20x5	10x6	N		51
94	38	63	147	Own		(19)			4	4		5.0	5.0	12	20	Y	20x5	10x6	N		52
99	42	68	159	Own		(19)			4	4		4.8	4.8	12	14	Y	22x6	10x6	N		53
99	42	68	159	Own		(19)			4	4		4.8	4.8	12	14	Y	22x6	10x6	N		54
126	66	73	183	Own		(19)			4	4		3.8	3.8	8	15	Y	22x6	10x6	N		55
126	66	73	183	Own		(19)			4	4		3.8	3.8	8	15	Y	22x6	10x6	N		56
128	65	78	185	Own		(20)			4	4		3.0	3.0	7	12	Y	22x6	4x10x7	N		57
158	92	88	206	Own		(20)						3.0	3.0	7	12	Y	22x7	4x15x9	N		58
163	93	95	225	Own		(21)			4	4		3.0	3.0	4	8	Y			N		59
168	91	102	229	Own		(21)			4	4		2.0	2.0	1½	2½		22x10	18x12	N		60
148	10	124		Ford 8RNN	100			Conv	4	4	Fr			30		N	8.25/15	10.00/15	N		61
180	24	140		Ford 8RNN	100			Conv	4	4	Fr			28		N	8.25/15	10.00/15	Y	7500	62
67	11	59	132	Wis VF-4	25			Conv	2	2	Fr	13.7	11.9	55	55	N	6.00/9	6.00/9	Y	1170	63
67	11	59	132	Wis VF-4	25			Conv	2	2	Fr	13.7	11.9	55	55	N	6.00/9	6.00/9	Y	1170	64
69¼	11	62	135	Wis VF-4	25			Conv	2	2	Fr	13.7	11.9	55	55	N	6.00/9	6.00/9	Y	1170	65
75	7⅜	65	135	Wau FC-260A	35			Conv	2	2	Fr	9.5	9.0	40	40	N	18x7x12½	14x4½x8	Y	2120	66
75	7⅜	65	135	Wau FC-260A	35			Conv	2	2	Fr	9.5	9.0	40	40	N	18x7x12⅛	14x4½x8	Y	2110	67
79	10	72	148	Wis VF-4	25			Conv	2	2	Fr	7.2	8.0	45	45	N	7.00/12	6.00/9	Y	1480	68
114	36½	86	183	Her JX4C3	60			Conv	2	2	Fr	12.5	12.0	35	35	N	7.50/15	7.00/12	Y	2485	69
129	43½	99	198	Her JX4D3	68			Conv	2	2	Fr	10.9	10.5	35	35	N	8.25/15	7.00/12	Y	2918	70
180	71	131	259	Int GRD	82½			Conv	4	4	Fr	22.6	22.6	39	39	N	7.50/15	7.50/15	Y	8420	71
177	48	131	250	Her JXE3	91			Conv	4	4	Fr	23.5	23.0	40	40	N	8.25/20	8.25/20	Y	7490	72
177	48	131	250	Her JXE3	91			Conv	4	4	Fr	23.5	23.0	40	40	N	8.25/20	8.25/20	Y	7485	73
179	48	132	252	Her JXE3	91			Conv	4	4	Fr	23.5	23.0	36¾	36¾	N	8.25/20	8.25/20	Y	7475	74
61	6	54		Wis AKN	6			Conv	1	1	Fr	4.0	4.0	15	20	Y	16¼x4x11¼	13x3½x8	N		75

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	OVERALL DIMENSIONS: Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Height: Overall—Including Carriage or Backguard
1	Lamson.....E	2000	15	3350	St	Fk	Ch	Y	10	3	45½	11¼	15	84	30	40	4½	3	57	63	83	94	134	68	108	.....
2	.....H	3000	24	4800	St	Fk	Ch	Y	10	3	48	12	15	71	30	40	4	3	56	63	83	96	136	68	108	.....
3	.....D-424	4000	24	6800	S	Fk	Hyd	Y	10	3	48	13½	24	82½	36	48	5¼	3	64	83	.....	.....	133¾	.....	128	.....
4	Lewis-Shepard.....EFFTT-1	1000	24	3320	St	Fk	Hyd	Y	10	3	44	12¼	24°	65½	24	48	4½	2½	65	88	91	120	185	97	142	185
5	59	1500	24	3385	St	Fk	Hyd	Y	10	3	44	12¼	24°	65½	24	48	4½	2½	65	88	89	120	161	97	136	161
6	.....EFFTT-2	2000	24	3970	St	Fk	Hyd	Y	10	3	47	12¼	24°	67¾	24	48	4½	2½	65	88	91	120	185	97	142	185
7	61	3000	24	5520	St	Fk	Hyd	Y	10	3	47	13¾	24°	69¼	24	48	4½	2½	65	88	91	120	185	97	142	185
8	.....EFFTT-3	3000	24	4936	St	Fk	Hyd	Y	10	3	51	13½	24°	75½	24	48	4½	2½	85	88	91	120	185	97	142	185
9	.....EFFTT-4	4000	24	5936	St	Fk	Hyd	Y	10	3	51	13½	24°	75½	24	48	4½	2½	81½	88	91	112	157	89	134	157
10	.....JFTT-1	1000	24	2880	S	Fk	Hyd	Y	10	2	36	6¼	24°	55½	24	48	3	2	11	59	83	99	147	82	130	178
11	.....JFTT-1.5	1500	24	3265	S	Fk	Hyd	Y	10	2	36	6¼	24°	55½	24	48	3	2	14	59	83	99	147	82	130	178
12	.....JFTT-2	2000	24	3350	S	Fk	Hyd	Y	10	2	42	6¼	24°	61½	24	48	3	.....	11	59	83	100	148	82	130	178
13	.....E1SCTL	1000	24	3060	W	Fk	Hyd	Y	5	0	32	6¾	24°	46¾	24	48	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
14	.....E1.5SCTL	1500	24	3180	W	Fk	Hyd	Y	10	2	42	6¼	24°	56¼	24	48	3	.....	14	59	83	99	147	82	130	178
15	.....E2SCTL	2000	24	3180	W	Fk	Hyd	Y	10	2	48	6¼	24°	62¾	24	48	3	.....	14	59	83	99	147	82	130	178
16	.....E2.5SCHTL	2500	24	3210	W	Fk	Hyd	Y	10	2	54	6¼	24°	68¾	24	48	3	.....	18	59	83	96	144	76	124	172
17	.....E3SCRTL	3000	24	3410	W	Fk	Hyd	Y	10	2	66	6¾	24°	81¼	24	48	3	.....	18	59	83	97	145	77	125	173
18	.....M2SST	2000	15	2900	St	Fk	Hyd	Y	.....	.....	.....	.....	24°	29	30	48	2	3	11½	59	83	97	145	79	127	145
19	.....M3SST	3000	24	2900	St	Fk	Hyd	Y	.....	.....	.....	.....	24°	29	30	48	2	3	11½	59	83	97	145	79	127	145
20	.....M3SOT	3000	24	2600	St	Fk	Hyd	Y	.....	.....	.....	.....	32°	26¼	38	48	2	3	25	59	83	94	144	73	125	144
21	.....M3SPT	3000	24	2575	St	Ptf	Hyd	Y	.....	.....	.....	.....	36°	26¾	24	54	2	3	30	59	83	92	144	73	129	144
22	.....E4SST	4000	24	2750	W	Fk	Hyd	Y	.....	.....	.....	.....	32°	29½	38	48	2	2	25	59	83	92	144	67	124	144
23	.....E4SOT	4000	24	2350	W	Fk	Hyd	Y	.....	.....	.....	.....	32°	26½	38	48	2	2	25	59	71	94	120	73	101	120
24	.....E4SPT	4000	24	2125	W	Ptf	Hyd	Y	.....	.....	.....	.....	36°	26½	38	54	2	2	30	59	83	92	144	73	129	144
25	Lift Trucks.....KHL	2000	.....	1405	W	Fk	HC	Y	.....	.....	.....	.....	.....	36⅛	24	42	.....	1½	.....	53	83	81¾	141¾	60	120	141¾
26	.....KHCM-18	1000	18	.....	W	Fk	HC	Y	.....	.....	.....	.....	.....	21⅛	30	42	.....	.....	.....	53	83	.....	.....	60	120	.....
27	.....HHL	1000	.....	.....	W	Fk	HE	Y	.....	.....	.....	.....	.....	21⅛	30	42	.....	.....	.....	53	83	.....	.....	60	120	.....
28	.....HHL	2000	.....	.....	W	Fk	HE	Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	Market Forge.....FT-55	2400	24	2100	S	Fk	Hyd	opt	10	0	31⅜	5⅛	36°	55½	6	72	5½	2¾	63°	83	83	106	146	86	126	.....
30	.....FT-63	2400	24	2100	S	Fk	Hyd	opt	10	0	31⅜	5⅛	36°	58¾	6	72	5½	2¾	63°	83	83	106	146	86	126	.....
31	.....TL-26	4000	24	2000	Sa	Ptf	Hyd	opt	0	0	.....	.....	24°	55½	30	48	3	2¾	63°	83	83	106	146	86	126	.....
32	Mercury.....A-2304	2001	24	3800	S	Fk	Hyd	Y	10	3	33⅞	13⅝	24°	58¼	.....	60	4¾	.....	.....	Sp	Sp	Sp	Sp	Sp	Sp	Sp
33	.....A-3404	2500	24	4100	S	Fk	Hyd	Y	10	3	40	13¾	24°	66¾	.....	60	4¾	.....	.....	Sp	Sp	Sp	Sp	Sp	Sp	Sp
34	.....A-3444	3000	24	4350	S	Fk	Hyd	Y	10	3	44	13¾	24°	66¾	.....	60	4½	.....	.....	Sp	Sp	Sp	Sp	Sp	Sp	Sp
35	.....A-4304	4000	24	6100	S	Fk	Hyd	Y	10	4	48	15¾	30°	80¾	.....	60	5	.....	.....	Sp	Sp	Sp	Sp	Sp	Sp	Sp
36	.....A-1484	4000	24	7000	St	Fk	Hyd	Y	15	5	54	18	30°	83¾	.....	60	6½	.....	.....	Sp	Sp	Sp	Sp	Sp	Sp	Sp
37	.....A-1544	6000	24	8700	St	Fk	Hyd	Y	15	5	54	18	30°	89¼	.....	60	6½	.....	.....	Sp	Sp	Sp	Sp	Sp	Sp	Sp
38	.....A-1005	3000	.....	2700	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	115	.....
39	.....A-1005	4000	.....	2880	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	115	.....
40	.....A-1006	3000	.....	2400	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	67	.....
41	.....A-1006	4000	.....	2600	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	67	.....
42	.....A-1018	4000	.....	3500	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62¼	.....
43	.....A-1019	4000	.....	4300	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	113	.....
44	.....A-1001	6000	.....	3700	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62¼	.....
45	.....A-1803	6000	.....	4500	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	113	.....
46	.....A-1013	10000	.....	5200	.....	Ptf	Hyd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	57	.....
47	Peterbilt.....A	6000	24	11000*	.....	Fk	.....	Y	12	5	.....	.....	.....	128½	64†	.....	.....	.....	Var	Var	Var	Var	Var	Var	217	.....
48	.....B	4500	24	9000*	.....	Fk	.....	Y	12	5	.....	.....	.....	125½	24†	.....	.....	.....	Var	Var	Var	Var	Var	Var	217	.....
49	.....D	10000	24	12500*	.....	Fk	.....	Y	12	5	.....	.....	.....	144½	27†	.....	.....	.....	Var	Var	Var	Var	Var	Var	217	.....
50	Raymond.....E2ST	2000	24	2210	St	Fk	Hyd	Y	.....	.....	51	.....	24°	71	30	44	2	2	45½	83†	.....	157†	.....	130†	.....	153¾
51	.....E3ST	3000	24	2310	St	Fk	Hyd	Y	.....	.....	51	.....	24°	71	30	44	2	2	51	83†	.....	145†	.....	118†	.....	147¾
52	.....E2S	.....	.....	.....	St	Fk	.....	N	.....	.....	51	.....	.....	71	30	40	.....	2	.....	83†	.....	.....	.....	68†	.....	.....
53	.....E3S	.....	.....	.....	St	Fk	.....	N	.....	.....	51	.....	.....	71	30	40	.....	2	.....	83†	.....	.....	.....	59†	.....	.....
54	Revolvator.....648	2500	24	2500*	W	Fk	.....	Y	.....	.....	.....	.....	.....	.....	36†	.....	.....	.....	12	.....	83	.....	130	.....	115	.....
55	648	2500	24	2400*	.....	Fk	.....	Y	.....	.....	.....	.....	.....	.....	38†	.....	.....	.....	12	68	.....	109	.....	85	.....	.....
56	648	2500	24	2150*	W	Fk	.....	N	.....	.....	.....	.....	.....	.....	36†	.....	.....	.....	.....	83	.....	.....	.....	64	.....	.....
57	.....V4P	4000	30	1530*	W	Fk	.....	.....	.....	.....	.....	.....	.....	.....	32	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
58	.....V4W	4000	.....	1500*	W	Ptf	.....	N	.....	.....	.....	.....	.....	.....	38	72	.....	.....	4	.....	.....	.....	.....	.....	.....	.....
59	.....V6P	6000	30	1530*	W	Fk	.....	.....	.....	.....	.....	.....	.....	.....	32	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
60	.....V6W	6000	.....	1500*	W	Ptf	.....	N	.....	.....	.....	.....	.....	.....	38	72	.....	.....	4	.....	.....	.....	.....	.....	.....	.....
61	.....ZHF	2500	24	Var	W	Fk	.....	N	.....	.....	.....	.....	.....	.....	36†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
62	.....Z4H	4000	30	.....	W	Ptf	.....	Y	.....	.....	.....	.....	.....	26½	36	60	.....	.....	12	.....	.....	.....	.....	.....	.....	.....
63	Service MoTowlift....S-4024	4000	24	7375	S	Fk	Hyd	Y	10	3	46	15¼	24°	81	.....	40	6	3¾	70	.....	91	.....	164	.....	144	204
64	Silent Hoist.....FK5	.....	24	14500	S	Fk	Hyd	Y	12	4	108	23½	24	150	42	72	18	9	.....	108	162	168	270	120	216	.....
65	.....FK7½	.....	24	19000	S	Fk	Hyd	Y	12	4	108	25	24	160	51	96	18	9	.....	108	162	168	270	120	216	.....
66	.....FK10	.....	24	20000	S	Fk	Hyd	Y	12	4	132	26	24	190	51	120	18	9	.....	120	174	180	282	120	216	.....
67	.....FK15	.....	30	30000	S	Fk	Hyd	Y	12	4	148	32	30	226	72	120	18	9	.....	120	153	180	243	120	180	.....

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
Outside Tailswing	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Truck Forward (mph)	Truck Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
57	.....	53	69¼[A]	Own.....E	15	.....	.....	SAu	1	1	Fr	6.0	6.0	45	45	Y	17x4½x12½	8½x4x4	N	.....	1
61¾	.....	60	75[A]	Own.....H	18	.....	.....	SAu	1	1	Fr	6.0	6.0	50	50	Y	17x5x12½	8½x4x4	N	.....	2
80	.....	96½	96[A]	Chry.....6A-320	65	.....	.....	SAu	2	2	Ff	11.0	11.0	40	68	N	21x6x15	18¼x8x11¼	N	.....	3
59	66½	65	111¼	General Electric	.....	30	(22)	.....	4	4	.....	5.0	5.0	48	45	Y	18¼x5	10x8	Y	1800	4
59	66½	65	111¼	General Electric	.....	36	(23)	.....	4	4	.....	5.0	5.0	50	45	Y	18¼x5	10x8	Y	1800	5
61	66½	65	113½	General Electric	.....	30	(24)	.....	4	4	.....	5.0	5.0	40	45	Y	18¼x6	10x8	Y	1800	6
61	67½	66	114¾	General Electric	.....	30	(25)	.....	4	4	.....	5.0	5.0	27	45	Y	16¼x6	9x5	Y	1800	7
66½	67¼	70	120	General Electric	.....	32	(26)	.....	4	4	.....	5.0	5.0	27	45	Y	16¼x6	9x5	Y	1800	8
66½	67¼	70	120	General Electric	.....	32	(26)	.....	4	4	.....	5.0	5.0	26	45	Y	18¼x7	9x5	Y	1800	9
49¼	52¼	65	95½	General Electric	.....	12	(23)	.....	2	2	.....	4.0	4.0	16	25	Y	10½x6	9x8	N	.....	10
49¼	52¼	66	95½	General Electric	.....	12	(23)	.....	2	2	.....	4.0	4.0	15	25	Y	10½x6	9x8	N	.....	11
55¼	52¼	67	101½	General Electric	.....	12	(26)	.....	2	2	.....	4.0	4.0	13	25	Y	10½x6	9x8	N	.....	12
40½	52¼	61	86¾	Auto-Lite	.....	12	(23)	.....	2	2	.....	3.2	3.2	16	25	Y	10½x6	9x8	N	.....	13
50½	52¼	69½	96¾	Auto-Lite	.....	12	(23)	.....	2	2	.....	3.1	3.1	10	25	Y	10½x6	9x8	N	.....	14
58½	52¼	73½	102¾	Auto-Lite	.....	12	(23)	.....	2	2	.....	3.0	3.0	9	25	Y	10½x6	9x8	N	.....	15
62½	52¼	76	108¾	Auto-Lite	.....	12	(23)	.....	2	2	.....	2.9	2.9	11½	25	Y	10½x6	9x6	N	.....	16
74½	52¾	85	121¼	Auto-Lite	.....	12	(23)	.....	2	2	.....	2.9	2.9	10	25	Y	10½x6	9x6	N	.....	17
69	50	61	69	General Electric	.....	12	(26)	.....	2	2	.....	3.8	3.8	26	25	Y	10½x6	4x3	N	.....	18
69	50	61	69	General Electric	.....	12	(26)	.....	2	2	.....	3.8	3.8	26	25	Y	10½x6	4x3	N	.....	19
69	50	61	69	General Electric	.....	12	(26)	.....	2	2	.....	3.8	3.8	26	25	Y	10½x6	3¼x5	N	.....	20
69	50	61	69	General Electric	.....	12	(26)	.....	2	2	.....	3.8	3.8	26	25	Y	10½x6	6x5	N	.....	21
65	49	.....	65	General Electric	.....	12	(23)	.....	2	2	.....	2.9	2.9	9	30	Y	10½x6	4x3	.....	.....	22
63	49	.....	63	General Electric	.....	12	(23)	.....	2	2	.....	2.9	2.9	9	30	Y	10½x6	3¼x5	.....	.....	23
63	49	.....	63	General Electric	.....	12	(23)	.....	2	2	.....	2.9	2.9	9	30	Y	10½x6	6x5	.....	.....	24
.....	.....	64¼[•]	93¼[•]	.....	.....	.....	(27)	.....	2	2	.....	2.0	2.0	15	.....	.....	10x3	3¼x2½	.....	.....	25
.....	.....	.....	.....	.....	.....	.....	(27)	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26
.....	.....	62[•]	83¼[•]	.....	.....	12	(28)	.....	2	2	.....	.....	.....	15	.....	.....	8x2½	3¼x2½	.....	.....	27
.....	.....	62[•]	83¼[•]	.....	.....	12	(28)	.....	2	2	.....	.....	.....	15	.....	.....	6x2½	3¼x2½	.....	.....	28
80	4	60	75	Baldor.....183-D	1	12	(29)	.....	(30)	(30)	N	4.0	4.0	24	48	Y	10½x7	7x5	Opt	500	29
80	4	60	75	Baldor.....183-D	1	12	(29)	.....	(30)	(30)	N	4.0	4.0	24	48	Y	10½x7	7x5	Opt	500	30
.....	.....	.....	.....	Baldor.....183-D	1	12	(29)	.....	(30)	(30)	N	4.0	4.0	24	48	Y	10½x7	6–10x5	Opt	500	31
60	.....	57½	.....	Own	.....	(31)	(32)	.....	3	3	.....	5.1	5.1	26	42	Y	17¾x6	10½x5	Y	.....	32
66½	.....	59	.....	Own	.....	(31)	450	.....	3	3	.....	4.9	4.9	26	42	Y	17¾x6	10½x5	Y	.....	33
70	.....	62	.....	Own	.....	(31)	450	.....	3	3	.....	4.9	4.9	26	42	Y	18x7	10x5	Y	.....	34
79	.....	70	.....	Own	.....	36	(33)	.....	4	4	.....	5.5	5.5	27	40	Y	21x7	15½x6	Y	.....	35
85	.....	72	.....	Own	.....	(4)	(33)	.....	4	4	.....	4.8	4.8	22	35	Y	22x7	15x6	Y	.....	36
91	.....	75	.....	Own	.....	36	(33)	.....	4	4	.....	4.8	4.8	22	35	Y	22x8	18x7	Y	.....	37
.....	.....	.....	.....	Own	.....	(31)	(34)	.....	.....	.....	.....	4.3	.....	16	.....	Y	18x.....	6½x.....	.....	.....	38
.....	.....	.....	.....	Own	.....	(31)	(34)	.....	.....	.....	.....	4.3	.....	16	.....	Y	16x.....	6½x.....	.....	.....	39
.....	.....	.....	.....	Own	.....	(31)	(34)	.....	.....	.....	.....	4.3	.....	16	.....	Y	18x.....	6½x.....	.....	.....	40
.....	.....	.....	.....	Own	.....	(31)	(34)	.....	.....	.....	.....	4.3	.....	16	.....	Y	18x.....	6½x.....	.....	.....	41
.....	.....	.....	.....	Own	.....	36	(33)	.....	.....	.....	.....	4.5	.....	13	.....	Y	20x.....	10½x.....	.....	.....	42
.....	.....	.....	.....	Own	.....	36	(33)	.....	.....	.....	.....	4.5	.....	13	.....	Y	20x.....	10½x.....	.....	.....	43
.....	.....	.....	.....	Own	.....	36	(33)	.....	.....	.....	.....	4.5	.....	11	.....	Y	20x.....	10½x.....	.....	.....	44
.....	.....	.....	.....	Own	.....	36	(33)	.....	.....	.....	.....	4.5	.....	11	.....	Y	20x.....	10½x.....	.....	.....	45
.....	.....	.....	.....	Own	.....	36	(33)	.....	.....	.....	.....	4.0	.....	10	.....	Y	20x.....	10½x.....	.....	.....	46
.....	.....	.....	.....	Chry...Ind. 5A426	65	.....	.....	.....	3	3	.....	11.5	11.5	60	60	N	.....	.....	.....	.....	47
.....	.....	.....	.....	Chry...Ind. 5A426	65	.....	.....	.....	3	3	.....	11.5	11.5	60	60	N	.....	.....	.....	.....	48
.....	.....	.....	.....	Chry...Ind. 5A426	65	.....	.....	.....	3	3	.....	11.5	11.5	60	60	N	.....	.....	.....	.....	49
.....	.....	64	69	Baldor.....183-D	1	12	400	.....	3	3	.....	3.3	3.3	21	Var	Y	10x5	10x5	N	.....	50
.....	.....	64	69	Baldor.....183-D	1	12	400	.....	3	3	.....	.....	.....	.....	Var	Y	10x5	10x5	N	.....	51
.....	.....	64	69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52
.....	.....	64	69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53
.....	.....	.....	66	Auto-Lite	.....	12	300	.....	2	2	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	54
.....	.....	.....	66	Auto-Lite	.....	12	300	.....	2	2	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	55
.....	.....	.....	66	Auto-Lite	.....	12	300	.....	.....	.....	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	56
.....	.....	.....	.....	Auto-Lite	.....	12	300	.....	2	2	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	57
.....	.....	.....	.....	Auto-Lite	.....	12	300	.....	2	2	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	58
.....	.....	.....	.....	Auto-Lite	.....	12	300	.....	2	2	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	59
.....	.....	.....	.....	Auto-Lite	.....	12	300	.....	2	2	.....	1.9	1.9	.....	.....	Y	.....	.....	.....	.....	60
.....	.....	.....	.....	Auto-Lite	.....	12	300	.....	2	2	.....	2.0	2.0	.....	.....	Y	.....	.....	.....	.....	61
.....	.....	.....	Var	Auto-Lite	.....	12	300	.....	2	2	.....	2.2	2.2	.....	.....	Y	.....	.....	.....	.....	62
75	7	67	140	Cont.....FS-145	38	.....	.....	Conv	2	2	Fr	8.0	6.0	40	40	N	21x7x15	18¼x8x11¼	Y	3000	63
153	135	.....	.....	(35)	68	.....	.....	.....	4	4	FF	18.0	18.0	35	35	N	7.50/15	7.50/15	Y	.....	64
155	135	.....	.....	(35)	72	.....	.....	.....	4	4	FF	18.0	18.0	35	35	N	8.25/20	9.00/15	Y	.....	65
188	166	.....	.....	(35)	72	.....	.....	.....	4	4	FF	12.0	12.0	20	20	N	9.00/20	9.00/15	Y	.....	66
226	.....	.....	.....	(35)	115	.....	.....	.....	4	4	FF	12.0	12.0	20	20	N	13.00/20	13.00/20	Y	.....	67

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED HIGH-LIFT FORK

Line Number	Make and Model	Maximum Capacity: Load (lb.)	Maximum Capacity: Load Center (in.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	Mast: Telescopic	Mast: Tilt: Rearward (Deg.)	Mast: Tilt: Forward (Deg.)	Overall Dimensions: Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Length: Load Center (In.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Overall Length—Carriage or Backguard
1	Towmotor LT-35	1500	15	3095	S	Fk	Hyd	Y	10	4	35	11½	15†	60¼	30†	...	5	2⅝	25½•	65	83	89	137	73¼	121¼	140¼
2	LT-35	2000	15	3405	S	Fk	Hyd	Y	10	4	35	11½	15†	60¼	30†	...	5	2⅝	25½•	65	83	89	137	73¼	121¼	140¼
3	LT-35	2000	15	4130	S	Fk	Hyd	Y	10	4	35	11½	24†	61¾	30†	...	5	2⅝	25½•	65	83	89	137	73¼	121¼	140¼
4	390	3000	24	4835	S	Fk	Hyd	Y	10	4	39	12½	15†	71¼	30†	...	8⅜	2¾	25½	65	101	89	161	73½	145½	164
5	420	4000	24	5500	S	Fk	Hyd	Y	10	4	42	12½	15†	74¼	30†	...	7	2¾	25½	65	101	89	161	73½	145½	164
6	460	4000	24	6210	S	Fk	Hyd	Y	10	4	46	12½	24†	78¼	36†	...	7¼	2¾	25½	65	101	89	161	73½	145½	164
7	400-P	2000	15	4510	S	Fk	Hyd	Y	12	3	40	15½	24†	74	30†	...	7⅛	4¾	21½•	65	83	91	139	73½	121½	140
8	480-P	4000	24	6935	S	Fk	Hyd	Y	10	4	48	18½	24†	88⅝	36†	...	9⅞	4¾	25¾•	67	85	91	163	73¾	121¾	140¼
9	LT-60	4000	24	7405	S	Fk	Hyd	Y	10	5	60	20¾	24†	106½	42†	...	12½	9	13	69	87	104½	140½	73½	109½	147
10	LT-60	5000	24	8025	S	Fk	Hyd	Y	10	5	60	20¾	24†	106½	42†	...	12½	9	13	69	87	104½	140½	73½	109½	147
11	LT-60	6000	24	8965	S	Fk	Hyd	Y	10	5	60	20¾	24†	106½	42†	...	12½	9	13	69	87	104½	140½	73½	109½	147
12	LT-50	5000	24	7530	S	Fk	Hyd	Y	10	4	50	15	20†	88	36†	...	7	4½	20½•	65	104	99¾	171¾	73½	145½	178
13	LT-56	6000	24	8415	S	Fk	Hyd	Y	10	4	56	15	24†	94	42†	...	8	4½	20½•	65	104	99¾	171¾	73½	145½	178
14	LT-62	7000	24	9420	S	Fk	Hyd	Y	10	4	62	16	24†	101	42†	...	8¾	4½	20½•	67	106	104½	176½	73¾	145¾	178
15	LT-72	10000	24	12080	S	Fk	Hyd	Y	10	5	72	16⅜	24†	111½	42†	...	8¾	3½	17½	71	86	106½	136½	76	106	138
16	LT-90	15000	36	16300	S	Fk	Hyd	Y	10	3	90	20	24†	134	42†	...	8	3	22	80	95	117⅜	147¾	76¼	106¼	148
17	Transitier 100	1000	15	2200	S	Fk	Hyd	Y	4	10	44	14	15	70	30	48	4	4	8½	54	78	80	128	60	180	128
18	200	2000	15	3100	S	Fk	Hyd	Y	4	10	44	14	15	70	30	48	4	4	8	54	78	80	128	60	180	128
19	250	2000	24	3600	S	Fk	Hyd	Y	4	10	44	14	24	74	30	48	4	4	8	54	78	80	128	60	180	128
20	300	3000	15	4400	S	Fk	Hyd	Y	4	10	44	15	15	74	30	48	4	4	10	56	82	84	132	60	180	132
21	200W	2000	15	3300	S	Fk	Hyd	Y	4	10	44	14	15	70	30	48	4	4	8	54	78	80	128	Sp	Sp	128
22	250W	2000	24	3700	S	Fk	Hyd	Y	4	10	44	14	24	70	30	48	4	4	8	54	78	80	128	Sp	Sp	128
23	300W	3000	15	4500	S	Fk	Hyd	Y	4	10	44	15	15	74	30	48	4	4	10	56	82	84	132	Sp	Sp	132
24	400	4000	24	6300	S	Fk	Hyd	Y	4	14	54	18	24	93½	30	48	5	4½	60	Sp	.....	140	.....	Sp	.....	140
25	500	5000	24	7500	S	Fk	Hyd	Y	4	14	54	18	24	95	30	48	5	4½	60	Sp	.....	140	.....	Sp	.....	140
26	Yale & Towne KG51AT-J10	1000	24	3065	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†	...	5	2½	12¾	60	68	105½	121½	92	108	129
27	KG51AT-10	1000	24	3135	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†	...	5	2½	18¾	72	90	126½	162½	104	146	167
28	KG51T-J10	1000	24	3065	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†	...	5	2½	47	60	68	105½	121½	92	108	129
29	KG51T-10	1000	24	3135	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†	...	5	2½	69	72	90	126½	162½	104	146	167
30	KG51AT-J15	1000	24	3700	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†	...	5	2½	13¼	60	68	105½	121½	92	108	129
31	KG51AT-15	1500	24	3770	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†	...	5	2½	19¼	72	90	126¼	162¼	110	146	167
32	KG51T-J15	1500	24	3700	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†	...	5	2½	47	60	68	105¼	121¼	92	108	129
33	KG51T-15	1500	24	3770	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†	...	5	2½	69	72	90	126¼	162¼	110	146	167
34	KG51AT-20H	2000	24	4420	S	Fk	Hyd	Y	10	3	43¾	13	24•	67¾	36†	...	5¾	2½	21	60	90	101¼	161¼	84	144	165
35	KG51T-20H	2000	24	4420	S	Fk	Hyd	Y	10	3	43¾	13	24•	67¾	36†	...	5¾	2½	69	60	90	101¼	161¼	84	144	165
36	KG51AT-30X	3000	24	5170	S	Fk	Hyd	Y	10	3	43¾	13¼	24•	71¾	36†	...	5¾	2½	21	60	90	101	161	84	144	165
37	KG51T-30X	3000	24	5170	S	Fk	Hyd	Y	10	3	43¾	13¼	24•	71¾	36†	...	5¾	2½	69	60	90	101	161	84	144	165
38	KG51AT-30	3000	24	6550	S	Fk	Hyd	Y	11½	6½	47	15½	24•	77¾	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
39	KG51T-30	3000	24	6550	S	Fk	Hyd	Y	11½	6½	47	15½	24•	77¾	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
40	KG51AT-40	4000	24	7150	S	Fk	Hyd	Y	11½	6½	47	15½	24•	80½	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
41	KG51T-40	4000	24	7150	S	Fk	Hyd	Y	11½	6½	47	15½	24•	80½	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
42	KGP51AT-40	4000	24	7525	S	Fk	Hyd	Y	11½	5	63	21	24•	103	36†	...	9¼	4¾	17	70	92	119	163	100	144	178
43	KGP51T-40	4000	24	7525	S	Fk	Hyd	Y	11½	5	63	21	24•	103	36†	...	9¼	4¾	64	70	92	119	163	100	144	178
44	KG51AT-50	5000	24	7950	S	Fk	Hyd	Y	11½	6½	47	15¾	24•	83¾	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
45	KG51T-50	5000	24	7950	S	Fk	Hyd	Y	11½	6½	47	15¾	24•	83¾	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
46	KG51AT-60	6000	24	8750	S	Fk	Hyd	Y	11½	6½	50	15¾	24•	86¾	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
47	KG51T-60	6000	24	8750	S	Fk	Hyd	Y	11½	6½	50	15¾	24•	86¾	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
48	KGP51AT-60	6000	24	9300	S	Fk	Hyd	Y	11½	5	68	21	24•	109¾	36†	...	9¼	4¾	17	70	92	119	163	100	144	178
49	KGP51T-60	6000	24	9300	S	Fk	Hyd	Y	11½	5	68	21	24•	109¾	36†	...	9¼	4¾	64	70	92	119	163	100	144	178
50	KGS51AT-60	6000	24	9050	S	Fk	Hyd	Y	8	3	55	16¼	24•	92¼	36†	...	6¼	3	17	68	90	117	161	100	144	178
51	K51AT-70	7000	24	9600	S	Fk	Hyd	Y	11½	6½	50	15¾	24•	89¼	36†	...	5¾	3	22	68	90	111	155	88	132	178
52	KTS51AT-70	7000	24	9075	S	Fk	Hyd	Y	8	3	62	16¼	24•	99¼	36†	...	6¼	3	22	68	90	111	155	88	132	178
53	KGP51AT-70	7000	24	10000	S	Fk	Hyd	Y	11½	5	68	21	24•	113	36†	...	9¼	4¾	22	70	92	113	157	88	132	186
54	KG51AT-80	8000	24	10200	S	Fk	Hyd	Y	11½	6½	55	16¼	24•	94¾	36†	...	6¼	3	22	68	90	111	155	88	132	178
55	KGP51AT-80	8000	24	11000	S	Fk	Hyd	Y	11½	5	68	21	24•	113	36†	...	9¼	4¾	22	70	92	113	157	88	132	186
56	KGS51AT-100	10000	24	13300	S	Fk	Hyd	Y	11	5	62	17¾	24•	105½	42†	...	6¼	3	26	83	90	136⅞	150⅞	110	124	161¼
57	K51AT-J10	1000	24	2010	S	Fk	Hyd	Y	10	3	36⅝	11¼	24•	57¾	36†	...	5	2½	11	60	68	105½	121½	92	108	129
58	K51AT-10	1000	24	2060	S	Fk	Hyd	Y	10	3	36⅝	11¼	24•	57¾	36†	...	5	2½	17	72	90	126½	162½	110	146	167
59	K51T-J10	1000	24	2060	S	Fk	Hyd	Y	10	3	36¾	11¼	24•	57¾	36†	...	5	2½	47	60	68	105½	121½	92	108	129
60	K51T-10	1000	24	2140	S	Fk	Hyd	Y	10	3	36⅝	11¼	24•	57¾	36†	...	5	2½	69	72	90	126½	162½	110	146	167
61	K51AT-J15	1500	24	2350	S	Fk	Hyd	Y	10	3	36⅝	11¾	24•	57¾	36†	...	5	2½	11	60	68	105½	121½	92	108	129
62	K51AT-15	1500	24	2120	S	Fk	Hyd	Y	10	3	41¼	11¾	24•	62¾	36†	...	5	2½	17	72	90	126½	162½	110	146	167
63	K51T-J15	1500	24	2400	S	Fk	Hyd	Y	10	3	36⅝	11¾	24•	57¾	36†	...	5	2½	47	60	68	105½	121½	92	108	129
64	K51T-15	1500	24	2180	S	Fk	Hyd	Y	10	3	41¼	11¾	24•	62¾	36†	...	5	2½	69	72	90	126½	162½	110	146	167
65	K51AT-J20	2000	24	2990	S	Fk	Hyd	Y	10	3	36⅝	11¾	24•	59½	36†	...	5	2½	11	60	68	105½	121½	92	108	129
66	K51AT-20	2000	24	2450	S	Fk	Hyd	Y	10	3	41¼	11¾	24•	62¾	36†	...	5	2½	17	72	90	126½	162½	110	146	167
67	K51T-J20	2000	24	3040	S	Fk	Hyd	Y	10	3	36⅝	11¾	24•	59½	36†	...	5	2½	47	60	68	105½	121½	92	108	129
68	K51T-20	2000	24	2510	S	Fk	Hyd	Y	10	3	41¼	11¾	24•	62¾	36†	...	5	2½	69	72	90	126½	162½	110	146	167
69	K51AT-30X	3000	24	3650	S	Fk	Hyd	Y	10	3	45¾	13¼	24•	70¾	36†	...	5	2½	21	68	90	117	161	100	144	165
70	K51AT-30	3000	24	4680	S	Fk	Hyd	Y	10	3	44	15½	24•	73¼	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
71	K51T-30X	3000	24	3730	S	Fk	Hyd	Y	10	3	45¾	13¼	24•	70¾	36†	...	5	2½	69	68	90	117	161	100	144	165
72	K51T30	3000	24	4680	S	Fk	Hyd	Y	11½	6½	44	15½	24•	73¼	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
73	K51AT4015X	4000	15	3860	S	Fk	Hyd	Y	10	3	45¾	13¼	15•	70¾	36†	...	5	2½	21	68	90	117	161	100	144	165
74	K51AT4015	4000	15	3870	S	Fk	Hyd	Y	11½	6½	44	15½	15•	73¼	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
75	K51T4015X	4000	15	3860	S	Fk	Hyd	Y	10	3	45¾	13¼	15•	70¾	36†	...	5	2½	69	68	90	117	161	100	144	165
76	K51T4015	4000	15	4870	S	Fk	Hyd	Y	11½	6½	44	15½	15•	73¼	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
77	K51AT40	4000	24	5480	S	Fk	Hyd	Y	11½	6½	44	15½	24•	74½	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
78	K51T40	4000	24	5480	S	Fk	Hyd	Y	11½	6½	44	15½	24•	74½	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178
79	K51AT50	5000	24	5750	S	Fk	Hyd	Y	11½	6½	48	15¾	24•	81	36†	...	5¾	2⅞	17	68	90	117	161	100	144	178
80	K51T50	5000	24	5750	S	Fk	Hyd	Y	11½	6½	48	15¾	24•	81	36†	...	5¾	2⅞	64	68	90	117	161	100	144	178

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Truck Forward (mph)	Truck Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
140¼	5	55	109½	Cont N-62	15½			Conv	2	2	Fr	7.0	7.0	35		N	17x4½	13x3½	Y		1
140¼	5	55	109½	Cont N-62	15½			Conv	2	2	Fr	7.0	7.0	35		N	17x4½	13x3½	Y		2
140¼	5	56	112	Cont N-62	15½			Conv	2	2	Fr	7.0	7.0	35		N	17x4½	13x3½	Y		3
60½	5	61	120½	Cont Y-112	27½			Conv‡	2	2	Fr	7.5	7.5	37		N	17¾x6	16¼x5	Y		4
184	5	63½	123½	Cont F-140	37½			Conv‡	2	2	Fr	7.5	7.5	37		N	18x7	16¼x5	Y		5
184	5½	63½	123½	Cont F-140	37½			Conv‡	2	2	Fr	7.5	7.5	37		N	18x7	16¼x5	Y		6
184	6	65	127½	Cont F-140	37½			Conv‡	2	2	Fr	7.5	7.5	37		N	18x7	16¼x5	Y		7
148	12½	60½	127½	Cont Y-112	27½			Conv	2	2	Fr	9.5	9.5	37		N	6.50/10	5.00/8	Y		8
140¼	17¾	71	143½	Cont F-140	37½			Conv‡	2	2	Fr	9.0	9.0	37		N	7.00/12	6.50/10	Y		9
147	50	87	185¾	Cont F-209	51			Conv‡	2	2	Fr	10.0	12.0	45		N	8.25/15	6.50/10	Y		10
125	50	87	185¾	Cont F-209	54			Conv‡	2	2	Fr	10.0	12.0	45		N	8.25/15	6.50/10	Y		11
147	62	88½	196¾	Cont F-209	54			Conv‡	2	2	Fr	10.0	12.0	45		N	8.25/15	7.50/10	Y		12
138	21	71½	145	Cont F-162	41			Conv‡	2	2	Fr	8.0	9.5	40		N	22x7	17¾x6	Y		13
178	90	75½	151	Cont F-162	41			Conv‡	2	2	Fr	8.0	9.5	40		N	22x8	17¾x6	Y		14
178	96	75½	151	Cont F-162	41			Conv‡	2	2	Fr	8.0	9.5	40		N	22x8	18x7	Y		15
178	104	29	160	Cont F-209	54			Conv‡	2	2	Fr	8.0	9.5	40		N	22x8	18x7	Y		16
178	115	27	160	Cont F-209	54			Conv‡	2	2	Fr	8.5	10.5	34		N	22x6	18x7	Y		
148	145	43	104	205 Cont F-226	60			Conv	2	2	Fr	5.0	5.5	26		N	22x8	18x8	Y		
128	61	.....	66	118 Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	17
128	61	.....	66	118 Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	18
128	64	.....	70	122 Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	19
132	64	.....	70	122 Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	20
128	61	.....	66	116 Wau ..... ICK	18			Conv	1	1	Fr	8.0	8.0	45	45	N	6.00/9	6.00/9	Opt	1000	21
128	64	.....	70	122 Wau ..... ICK	18			Conv	1	1	Fr	8.0	8.0	45	45	N	6.00/9	6.00/9	Opt	1000	22
132	64	.....	70	122 Wau ..... ICK	18			Conv	1	1	Fr	8.0	8.0	45	45	N	6.00/9	6.00/9	Opt	1000	23
140	65	7¼	75	145 Wil CJ3A	55			Conv	2	2	Fr	12.0	12.0	55	45	N	7.50/12	6.00/9	Opt	2900	24
140	85	7½	75	145 Wil CJ3A	55			Conv	2	2	Fr	12.0	12.0	55	45	N	7.50/12	6.00/9	Opt	2900	25
129	58	5	64	118 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	26
167	58	5	64	118 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	27
129	58	5	64	118 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	28
167	58	5	64	118 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	29
129	60	6	64	120 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	30
167	60	6	64	120 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	31
129	60	6	64	120 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	32
167	60	6	64	120 Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	33
165	65	6	67	126 Int U-2A	25			Conv	2	2	Fr	7.5	7.5	40	75		17¾x6x12½	14x4½x8	Y	2693	34
165	65	6	67	126 Int U-2A	25			Conv	2	2	Fr	7.5	7.5	40	75		17¾x6x12½	14x4½x8	Y	2693	35
165	67	6	68	128 Int U-2A	25			Conv	2	2	Fr	7.5	7.5	32	48		17¾x6x12½	14x4½x8	Y	2682	36
165	67	6	68	128 Int U-2A	25			Conv	2	2	Fr	7.5	7.5	32	48		17¾x6x12½	14x4½x8	Y	2682	37
178	73	6	71	137 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4202	38
178	73	6	71	137 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4202	39
178	75	6	72	140 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4195	40
178	75	6	72	140 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4195	41
178	75	7½	82	140 Chry 6A-215	65			Conv	2	2	Fl	12.5	12.5	40	100		7.50/15	6.50/10	Y	2848	42
178	75	7½	82	140 Chry 6A-215	65			Conv	2	2	Fl	12.5	12.5	40	100		7.50/15	6.50/10	Y	2848	43
178	79	7	73	142 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	38	60		21x7x15	16¼x6x11¼	Y	4180	44
178	79	7	73	142 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	38	60		21x7x15	16¼x6x11¼	Y	4180	45
178	83	8	76	147 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	40	60		21x8x15	16¼x6x11¼	Y	4168	46
178	83	8	76	147 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	40	60		21x8x15	16¼x6x11¼	Y	4168	47
178	113	7½	91	182 Chry 6A-215	65			Conv	2	2	Fl	12.5	12.5	38	100		7.50/15	7.50/10	Y	2821	48
178	113	7½	91	182 Chry 6A-215	65			Conv	2	2	Fl	12.5	12.5	38	100		7.50/15	7.50/10	Y	2821	49
178	89	9	78	153 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	38	60		22x9x16	16¼x7x11¼	Y	3965	50
178	85	8	76	150 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	33	50		21x8x15	16¼x6x11¼	Y	4157	51
178	89	12	84	164 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	33	50		22x12x16	16¼x7x11¼	Y	3965	52
178	116	7½	92	185 Chry 6A-215	65			Conv	2	2	Fl	12.5	12.5	33	50		7.50/15	7.50/10	Y	2810	53
178	91	9	80	155 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	30	50		22x9x16	16¼x7x11¼	Y	3950	54
178	118	7½	94	185 Chry 6A-215	65			Conv	2	2	Fl	12.5	12.5	30	50		7.50/15	7.50/10	Y	2795	55
161¼	103	12	86	169 Chry 6A-215	65			Conv	2	2	Fl	8.5	8.5	25	60		22x12x16	16¼x7x11¼	Y	3905	56
129	58	.....	64	117 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N	.....	57
167	58	.....	64	117 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N	.....	58
129	58	.....	64	117 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N	.....	59
167	58	.....	64	117 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N	.....	60
129	58	.....	64	118 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	61
167	62	.....	65	122 OGE		(4)	450	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	62
129	58	.....	64	118 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	63
167	62	.....	65	122 OGE		(4)	450	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	64
129	58	.....	64	118 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	65
167	62	.....	65	122 OGE		(4)	400	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	66
129	59	.....	64	119 OGE		(4)	450	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	67
167	62	.....	65	122 OGE		(4)	450	DR	4	4	.....	6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N	.....	68
185	70	.....	68	131 OGE		(4)	500	DR	4	4	.....	6.5	6.5	24	48	Y	17¾x6x12½	14x4x8	N	.....	69
178	75	.....	72	139 OGE		36	500	DR	4	4	.....	5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼	Y	5000	70
165	70	.....	68	131 OGE		(4)	500	DR	4	4	.....	6.5	6.5	24	48	Y	17¾x6x12½	14x4½x8	N	.....	71
178	75	.....	72	139 OGE		36	500	DR	4	4	.....	5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼	Y	.....	72
165	70	.....	68	131 OGE		(4)	500	DR	4	4	.....	6.5	6.5	24	48	Y	17¾x6x12½	14x4½x8	.....	.....	73
178	75	.....	72	139 OGE		36	500	DR	4	4	.....	5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼	.....	.....	74
165	70	.....	68	131 OGE		(4)	500	DR	4	4	.....	6.5	6.5	24	48	Y	17¾x6x12½	14x4½x8	.....	.....	75
178	75	.....	72	139 OGE		36	500	DR	4	4	.....	5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼	.....	.....	76
178	75	.....	72	139 OGE		36	500	DR	4	4	.....	5.0	5.0	23	60	Y	21x6x15	16¼x5x11¼	.....	.....	77
178	75	.....	72	139 OGE		36	500	DR	4	4	.....	5.0	5.0	23	60	Y	21x6x15	16¼x5x11¼	.....	.....	78
178	82	.....	75	146 OGE		36	650	DR	4	4	.....	5.0	5.0	22	60	Y	21x7x15	16¼x6x11¼	.....	.....	79
178	82	.....	75	146 OGE		36	650	DR	4	4	.....	5.0	5.0	22	60	Y	21x7x15	16¼x6x11¼	.....	.....	80

For Abbreviations and References see pages 112 and 113

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY Load (lb.)	MAXIMUM CAPACITY Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST Telescopic	MAST Tilt Rearward (Deg.)	MAST Tilt Forward (Deg.)	OVERALL DIMENSIONS Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	Length Less Forks	Length Fork Minimum	Length Fork Maximum	Height Under-clearance At Truck Center	Height Under-clearance At Mast	Height Free Lift	Height Mast Collapsed Minimum	Height Mast Collapsed Maximum	Height Mast Extended Minimum	Height Mast Extended Maximum	Height Lifting Minimum	Height Lifting Maximum	Overall—Including Carriage or Backguard
	Yale & Towne (Continued)																									
1	K51AT80	6000	24	6250	S	Fk	Hyd	Y	11½	6½	48	15¾	24*	81	36†	....	5¾	2⅞	17	68	90	117	161	100	144	178
2	K51AT70	7000	24	6860	S	Fk	Hyd	Y	11½	6½	51	15¾	24*	85	36†	....	5¾	3	22	68	90	111	155	88	132	166
3	K51AT80	8000	24	6970	S	Fk	Hyd	Y	11½	6½	54	16¼	24*	90¾	36†	....	6¼	3	22	68	90	111	155	88	132	166
4	K51AT100	10000	24	10660	S	Fk	Hyd	Y	11	5	61	17¾	24*	95	42†	....	6¼	3	30	83	90	138⅞	150⅞	110	124	161¼
5	K33GH50	50000	SA	.....	St	Ptf	Ch	N	N	N	117½	.....	.....	.....	.....	.....	6	6	52	112†	....	112†	....	75†	....	112†
6	K41-4	4000	24	.....	St	Fk	Ch	Y	10	5	50	14⅛	24*	76½	36†	....	4½	....	63	68	83	.....	.....	89	119	153
7	K41-5	5000	24	.....	St	Fk	Ch	Y	8	2	52½	15	24*	81¼	36†	....	4½	....	63	68	83	.....	.....	89	119	153
8	K41-6	6000	24	.....	St	Fk	Ch	Y	8	2	52½	15¾	24*	82	36†	....	5½	....	62	68	83	.....	.....	88	118	152
9	K41-7	7000	24	.....	St	Fk	Ch	Y	8	2	56	15¾	24*	86¾	36†	....	5½	....	62	68	83	.....	.....	88	118	152
10	K41-8	8000	24	.....	St	Fk	Ch	Y	8	3	60	15¾	24*	90¾	42†	....	5½	....	58	83†	....	.....	.....	107†	....	141
11	K41-10	10000	24	.....	St	Fk	Ch	Y	8	2	67	20¼	30*	105¼	36†	....	4½	....	65	96†	....	.....	.....	110†	....	146
12	K41-12	12000	36	.....	St	Fk	Ch	Y	8	2	67	20¼	24*	105¼	36†	....	4½	....	65	96†	....	.....	.....	110†	....	146
13	K41-12	12000	36	.....	St	Fk	Ch	N	5	2	75	18¾	30*	113¼	48†	....	4	....	58	96†	....	.....	.....	58†	....	96
14	K41-14	14000	36	.....	St	Fk	Ch	N	5	2	78	18¾	36*	113¾	48†	....	4	....	58	96†	....	.....	.....	58†	....	96
15	K41-15	15000	36	.....	St	Fk	Ch	N	5	2	75	18¾	36*	113¾	48†	....	4	4	58	96†	....	.....	.....	58†	....	96
16	K41-16	16000	36	.....	St	Fk	Ch	N	5	2	86	18	39*	123	48†	....	4	4	54	96†	....	.....	.....	54†	....	96
17	K41-18	18000	36	.....	St	Fk	Ch	N	5	2	86	18	39*	123	48†	....	4	4	54	96†	....	.....	.....	54†	....	96
18	K51-200	20000	36	.....	St	Fk	Hyd	N	.....	.....	106	27	48*	151½	....	....	12	12	76	148†	....	.....	.....	76†	....	180
19	K51-250	25000	SA	.....	St	Fk	Hyd	N	.....	.....	106	27	48*	151½	....	....	12	12	76	148†	....	.....	.....	76†	....	180
20	K51-300	30000	48	.....	St	Fk	Hyd	N	N	N	106	27	48*	152	....	....	12	12	76	148†	....	.....	.....	76†	....	180
21	K51-400	40000	48	.....	St	Fk	Hyd	N	N	N	106	27	48*	157	....	....	12	12	72	148†	....	.....	.....	72†	....	180
22	K51-500	50000	48	.....	St	Fk	Hyd	N	N	N	110	29	48*	169	....	....	12	12	61	148†	....	.....	.....	61†	....	180
23	K51-600	60000	48	.....	St	Fk	Hyd	N	N	N	110	29	48*	173	....	....	12	12	61	148†	....	.....	.....	61†	....	180
24	K51-800	80000	48	.....	St	Fk	Hyd	N	N	N	110	29	30*	173	....	....	12	12	61	148†	....	.....	.....	61†	....	180
25	KMUH	4000	24	2510	St	Ptf	Ch	Y	N	N	(36)	.....	.....	.....	.....	.....	2¼	2¼	61	68	83	68	139	46	115	139
26	K22-4	4000	24	3800	St	Ptf	Ch	Y	N	N	61	.....	.....	.....	.....	.....	3⅝	3⅝	51	68	83	68	.....	47	113	.....
27	K25-6	6000	24	4735	St	Ptf	Ch	Y	N	N	64	.....	.....	.....	.....	.....	3⅝	3⅝	62	.....	83†	.....	.....	.....	113†	.....
28	K25H-6	6000	24	4850	St	Ptf	Ch	Y	N	N	64	.....	.....	.....	.....	.....	4	4	67	.....	83†	.....	.....	.....	118†	.....
29	K33-10	10000	24	6380	St	Ptf	Ch	Y	.....	.....	(37)	.....	.....	.....	.....	.....	3⅝	.....	57	.....	.....	.....	.....	.....	.....	.....
30	K33H-12	12000	36	7600	St	Ptf	Ch	N	N	N	(38)	.....	.....	.....	.....	.....	3½	3½	63	83†	.....	.....	.....	63†	.....	94
31	K33SH-16	16000	36	8100	St	Ptf	Ch	N	N	N	(39)	.....	.....	.....	.....	.....	3½	3½	56	83†	.....	.....	.....	56†	.....	94
32	K33GH20	20000	36	.....	St	Ptf	Ch	N	N	N	(40)	.....	.....	.....	.....	.....	.....	.....	72	.....	.....	.....	.....	.....	.....	.....
33	K33GH30	30000	SA	.....	St	Ptf	Ch	N	N	N	108	.....	.....	.....	.....	.....	.....	.....	75	.....	.....	.....	.....	.....	.....	.....
34	K33GH40	40000	SA	.....	St	Ptf	Ch	N	N	N	117½	.....	.....	.....	.....	.....	.....	.....	75	.....	.....	.....	.....	.....	.....	.....
35	M10HF	1000	15	1755	W	Fk	Hyd	N	N	N	28⅝	6¼	8*	44¼	24†	....	2½	3	54½	68	83	.....	.....	46	80	89
36	M15HF	1500	15	2081	W	Fk	Hyd	N	N	N	28⅝	6¼	10*	48¾	24†	....	2½	3	54½	68	83	.....	.....	46	80	89
37	M15HTF	1500	15	2780	W	Fk	Hyd	N	10	2	42	6¾	24*	57½	30†	....	2½	3	54	68	83	.....	.....	46	80	89
38	M15TTF	1500	15	3155	W	Fk	Hyd	Y	10	2	42	6¾	24*	57½	30†	....	2½	3	60¾	68	83	112¼	142¼	90	120	149
39	M20HTF	2000	24	2805	W	Fk	Hyd	N	18	2	48	6¾	24*	63¾	30†	....	2½	3	54	68	83	68	83	46	80	89
40	M20TTF	2000	24	3180	W	Fk	Hyd	Y	18	2	48	6¾	24*	63¾	30†	....	2½	3	60¾	68	83	112¼	142¼	90	120	149
41	M25HTF	2500	24	3105	W	Fk	Hyd	N	18	2	48	6¾	24*	67¾	30†	....	2½	3	54	68	83	68	83	46	80	89
42	M25TTF	2500	24	3480	W	Fk	Hyd	Y	18	2	48	6¾	24*	67¾	30†	....	2½	3	60¾	68	83	112¼	142¼	90	120	149
43	M30HTF	3000	24	3430	W	Fk	Hyd	N	18	2	57	7¼	24*	77	30†	....	2½	3	54	68	83	68	83	43¼	58¼	87¼
44	M30TTF	3000	24	3805	W	Fk	Hyd	Y	18	2	57	7¼	24*	77	30†	....	2½	3	57½	68	83	108¾	138¾	83¼	113¼	142¼
45	M30SF	3000	24	.....	W	Fk	Hyd	N	N	N	49¼	.....	.....	34 1/16	36†	....	1½	2¼	54	68	83	.....	.....	49	64	90
46	M30STF	3000	24	.....	W	Fk	Hyd	Y	N	N	49¼	.....	.....	34 1/16	36†	....	1½	2¼	19	68	83	113	143	93½	123½	152½
47	M40SF	4000	24	.....	W	Fk	Hyd	N	N	N	61¾	.....	.....	38	42†	....	1½	2	54	68	83	.....	.....	48½	63½	90
48	M40STF	4000	24	.....	W	Fk	Hyd	Y	N	N	61¾	.....	.....	38	42†	....	1½	2	61	88	83	113	143	91	121	150
49	M4HL7	4000	24	1780	W	Ptf	Hyd	N	N	N	(41)	.....	30*	.....	.....	.....	1⅞	1⅞	.....	66½	83	.....	.....	50	66½	83
50	M4HL11	4000	24	1780	W	Ptf	Hyd	N	N	N	(41)	.....	30*	.....	.....	.....	2½	2½	.....	66½	83	.....	.....	54	70½	83
51	M25HP	2500	24	1320	W	Fk	Hyd	N	N	N	(42)	.....	21*	39	36	42	1⅝	1⅝	66	68	83	.....	.....	51	66	83
52	M30HLT	3000	24	2875	W	Ptf	Hyd	Y	N	N	(43)	.....	30*	.....	.....	.....	2	2	27	68	83	.....	.....	93	123	142
53	M40HLT	4000	24	3025	W	Ptf	Hyd	Y	N	N	(44)	.....	30*	.....	.....	.....	2	2	27	68	83	.....	.....	93	123	142
54	RSA-2	2000	15	2400	St	Fk	Hyd	N	N	N	(45)	20¾	24*	29¾	.....	.....	1½	1½	.....	60	90	.....	.....	46½	76½	.....
55	RSAT-2	2000	15	2600	St	Fk	Hyd	Y	N	N	(45)	20¾	24*	29¾	.....	.....	1½	1½	21	60	90	110½	170½	87	147	176
56	RST-2	2000	15	2670	St	Fk	Hyd	Y	N	N	(45)	20¾	24*	29¾	.....	.....	1½	1½	53	60	90	110½	170½	87	147	176
57	RSA-3	3000	24	2450	St	Fk	Hyd	N	N	N	(45)	20¾	24*	29¾	.....	.....	1½	1½	.....	60	90	.....	.....	46½	76½	.....
58	RSAT-3	3000	24	2850	St	Fk	Hyd	Y	N	N	(45)	20¾	24*	29¾	.....	.....	1½	1½	.....	60	90	110½	170½	87	147	176
59	RST-3	3000	24	2720	St	Fk	Hyd	Y	N	N	(45)	20¾	24*	29¾	.....	.....	1½	1½	53	60	90	110½	170½	87	147	176

ABBREVIATIONS

*—Including battery.
†—Standard.
▲—Without head.
•—Maximum.
■—With 48" load.
‡—Includes battery and counterweight.
♣—Including platform or forks.
‡—Automatic transmission available on gasoline models.

(1)—60 to 72.
(2)—36x12 or 36x16.
(3)—48 to 60.
(4)—30 to 36.
(5)—24 to 36.
(6)—350 to 400.
(7)—Hercules IXB gasoline engine and Baker 18-2460 electric motor.
(8)—Gasoline engine, 34; electric motor, 7-8.
(9)—36 to 48.
(10)—250 to 450.
(11)—350 to 500.
(12)—400 to 550.
(13)—450 to 600.
(14)—500 to 650.
(15)—600 to 700.
(16)—650 to 750.
(17)—750 to 800.
(18)—24 to 32.
(19)—32 to 36.
(20)—36 to 60.
(21)—48 to 72.
(22)—250 to 300.
(23)—300 to 360.
(24)—350 to 420.
(25)—375 to 480.
(26)—450 to 540.
(27)—300 to 485.
(28)—130 to 250.
(29)—340 to 500.
(30)—Two standard; three optional.
(31)—28 to 30.
(32)—350 to 450.
(33)—450 to 550.
(34)—300 to 350.
(35)—Hercules, Continental or Chrysler.
(36)—50 and 10.
(37)—70 and 14.
(38)—64 and 20.
(39)—64½ and 20.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS—*concluded*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside Tailswing (Including Carriage or Backguard)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
84	.....	76	148	OGE	.....	36	650	DR	4	4	.....	5.0	5.0	21	60	Y	21x8x15	16¼x6x11¼	.....	.....	1
86	.....	77	150	OGE	.....	36	700	DR	4	4	.....	5.0	5.0	16	50	Y	21x8x15	16¼x6x11¼	.....	.....	2
91	.....	81	156	OGE	.....	36	700	DR	4	4	.....	5.0	5.0	15	50	Y	22x9x16	16¼x7x11¼	.....	.....	3
91	.....	84	157	OGE	.....	36	800	DR	4	4	.....	5.0	5.0	12	50	Y	22x12x16	16¼x7x11¼	.....	.....	4
151	.....	122	189	Electric Specialty	.....	.....	.....	DR	4	4	.....	.....	.....	.....	.....	Y	22x14	22x14	.....	.....	5
73	23	72	136	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	21	45	Y	20x6	15x5	.....	.....	6
84	27	75	147	Electric Specialty	.....	.....	.....	DR	4	4	.....	6.0	6.0	20	45	Y	20x7x16	15x6x11¼	.....	.....	7
85	25	77	148	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	13	28	Y	22x8x16	15x6x11¼	.....	.....	8
87	28	80	153	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	12	28	Y	22x8x16	15x6x11¼	.....	.....	9
94	32	82	158	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	12	30	Y	22x10x16	15x7x11¼	.....	.....	10
104	33	93	174	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	10	16	Y	22x14	15x9	.....	.....	11
104	33	93	174	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	10	16	Y	22x14	15x9	.....	.....	12
108	32	97	175	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	8	12	Y	22x16	22x10	.....	.....	13
108	32	97	173	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	8	12	Y	22x16	22x10	.....	.....	14
108	3	97	175	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	8	12	Y	22x16	22x10	N	.....	15
119	4	104	185	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	6	10	Y	22x18	22x10	N	.....	16
119	4	104	185	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	6	10	Y	22x18	22x10	N	.....	17
154	3	135	225	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	10	35	Y	36x12	22x10	N	.....	18
154	3	135	225	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	10	35	Y	36x12	22x10	N	.....	19
154	3	135	225	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	10	35	Y	36x16	22x10	N	.....	20
166	3	138	226	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	10	35	Y	36x16	22x10	N	.....	21
184	3	167	255	Electric Specialty	.....	.....	.....	DR	4	4	.....	3.0	3.0	10	35	Y	36x12	36x12	N	.....	22
185	3	168	258	Electric Specialty	.....	.....	.....	DR	4	4	.....	3.0	3.0	10	35	Y	36x12	36x12	N	.....	23
185	3	168	258	Electric Specialty	.....	.....	.....	DR	4	4	.....	3.0	3.0	10	35	Y	36x12	36x12	N	.....	24
87	39	63	133	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.5	5.5	10	24	Y	16x4	.....	.....	.....	25
99	43	66	153	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	18	30	Y	20x5	.....	.....	.....	26
105	46	71	157	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.5	5.5	14	26	Y	20x6x16	.....	.....	.....	27
102	45	67	154	Electric Specialty	.....	.....	.....	DR	4	4	.....	5.0	5.0	13	22	Y	20x6	.....	.....	.....	28
124½	64½	76	182	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	6	11	Y	20x6	.....	.....	.....	29
125½	66	76	183	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	6	11	Y	20x6	.....	.....	.....	30
126	64	76	184	Electric Specialty	.....	.....	.....	DR	4	4	.....	4.5	4.5	6	11	Y	20x7	.....	.....	.....	31
164	90	95	245	Electric Specialty	.....	.....	.....	DR	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32
137	.....	105	165	Electric Specialty	.....	.....	.....	DR	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33
137	.....	113	167	Electric Specialty	.....	.....	.....	DR	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34
41	.....	61	98	AL.....MCP4002	1	12	450	DR	2	2	.....	2.4	2.4	8	Reg	Y	10½x5	10½x5	N	.....	35
45	.....	61	100	AL.....MCP4002	1	12	450	DR	2	2	.....	2.4	2.4	8	Reg	Y	10½x5	10½x5	N	.....	36
54	.....	63	109	AL.....MCP4002	1	12	450	DR	2	2	.....	2.4	2.4	9	Reg	Y	10½x5	10½x5	N	.....	37
54	.....	63	109	AL.....MCP4002	1	12	450	DR	2	2	.....	2.4	2.4	9	Reg	Y	10½x5	10½x5	N	.....	38
80½	.....	65	116	AL.....MCP4002	1	12	450	DR	2	2	.....	2.3	2.3	9	Reg	Y	10½x5	10½x5	N	.....	39
80½	.....	65	116	AL.....MCP4002	1	12	450	DR	2	2	.....	2.3	2.3	9	Reg	Y	10½x5	10½x5	N	.....	40
84	.....	66½	119	AL.....MCP4002	1	12	450	DR	2	2	.....	2.2	2.2	8	Reg	Y	10½x5	10½x5	N	.....	41
84	.....	66½	119	AL.....MCP4002	1	12	450	DR	2	2	.....	2.2	2.2	8	Reg	Y	10½x5	10½x5	N	.....	42
72	.....	70	128	AL.....MCP4002	1	12	450	DR	2	2	.....	2.1	2.1	13	Reg	Y	10½x5	10½x5	N	.....	43
72	.....	70	128	AL.....MCP4002	1	12	450	DR	2	2	.....	2.1	2.1	13	Reg	Y	10x5	10x5	N	.....	44
67½	.....	67½	87	AL.....MCP4002	1	12	450	DR	2	2	.....	2.3	2.3	15	Reg	Y	10x5	10x5	N	.....	45
67½	.....	67½	87	AL.....MCP4002	1	12	450	DR	2	2	.....	2.3	2.3	15	Reg	Y	10x5	10x5	N	.....	46
76½	.....	75	92½	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	6	Reg	Y	10x5	10x5	N	.....	47
76½	.....	75	92½	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	14	Reg	Y	10x5	10x5	N	.....	48
.....	.....	.....	.....	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	5	Reg	Y	10x5	10x5	N	.....	49
.....	.....	.....	.....	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	5	Reg	Y	10x5	10x5	N	.....	50
.....	.....	.....	.....	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	8	Reg	Y	10x6½x5	10x6½x5	N	.....	51
.....	.....	.....	.....	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	14	Reg	Y	10x5	10x5	N	.....	52
.....	.....	.....	.....	AL.....MCP4002	1	12	450	DR	2	2	.....	2.0	2.0	14	Reg	Y	10x5	10x5	N	.....	53
.....	.....	63	74	Kim.....ET423	1¼	12	600	DR	3	3	.....	3.4	3.4	25	Reg	Y	10x5	10x5	N	.....	54
.....	.....	63	74	Kim.....ET423	1¼	12	600	DR	3	3	.....	3.4	3.4	25	Reg	Y	10x5	10x5	N	.....	55
.....	.....	63	74	Kim.....ET423	1¼	12	600	DR	3	3	.....	3.4	3.4	25	Reg	Y	10x5	10x5	N	.....	56
.....	.....	63	74	Kim.....ET423	1¼	12	600	DR	3	3	.....	3.4	3.4	18	Reg	Y	10x5	10x5	N	.....	57
.....	.....	63	74	Kim.....ET423	1¼	12	600	DR	3	3	.....	3.4	3.4	18	Reg	Y	10x5	10x5	N	.....	58
.....	.....	63	74	Kim.....ET423	1¼	12	600	DR	3	3	.....	3.4	3.4	18	Reg	Y	10x5	10x5	N	.....	59

(40)—96 and 20.
(41)—53½ to 59.
(42)—50 to 55.
(43)—61½ to 79½.
(44)—62½ to 80½.
(45)—36 to 45.

AB—Automotive regenerative brake.
AL—Electric Auto-Lite Co.
Aut—Automatic.
CA—Conventional and automatic.
Ch—Chain.
Chry—Chrysler Corp.
Cont—Continental Motors Corp.
Conv—Conventional.
DB—Dynamic brake.
DR—Double reduction gear drive.
Ele—Electric.
FE—Friction and electric.
Ff—Friction and fluid.
FF—Friction or fluid.
Fk—Fork.
Fkr—Fork or ram.
Fl—Fluid.
Fr—Friction.
FR—Fork ram.
FV—Flow control valve.
HC—Hydraulic and chai
HE—Hydraulic electric.
Her—Hercules Motor Co.
Hyd—Hydraulic.
Inf—Infinite.
Int—International Harvester Co.
Kim—Star Kimble Co.
N—No or none.
OGE—Own, General Electric or Electric Specialty Co.
Opt—Optional.
Ptf—Platform.
R—Ram.
Reg—Regulated.
S—Sits.
SA—Designed for specific application.
SAu—Semi-automatic.
Sp—Built to specification.
Ss—Sits or stands.
St—Stands.
Var—Various.
W—Walks.
Wau—Waukesha Motor Co.
Wil—Willys Motor Co.
Wis—Wisconsin Motor Co.
Y—Yes.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED LOW-LIFT FORK

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Maximum Load Capacity (lbs.)	Service Weight (lbs.)—Excluding Battery	Operator—Walks or Rides	Motive Power	Lifting Power	OVERALL CHASSIS DIMENSIONS (Ins.) Length—Excluding Platform or Forks	Width	Height—To Top of Controls	Lowest Underclearance	PLATFORM DIMENSIONS (Ins.) Length Minimum	Length Maximum	Width Minimum	Width Maximum	Height Above Ground Lowered	Height Above Ground Elevated	FORK DIMENSIONS (Ins.) Length Minimum	Length Maximum	Width of Face	Lateral Outside Overall Width Minimum	Lateral Outside Overall Width Maximum	Height Above Ground Lowered	Height Above Ground Elevated
1	Atlas 3EA17	6000	4400*	R	E-G		122†	40½		3⅛	54▲		27▲		11	17							
2	Automatic LN-2	4000	2475	R	EM	Hyd	112½†	39†			55▲		26▲		10¼	16¼							
3	LN-3	6000	3150	R	EM	Hyd	120½†	41†			55▲		27▲		10¾	16¾							
4	LO-5	10000	4500	R	EM	Mec	126½†	41†			60▲		26▲		11	16							
5	PE-427	4030		W	EM	Hyd	30⅞	30	50	1⅜							29½	59½	9▲	27▲		3⅛	9⅛
6	PE-627	6000		W	EM	Hyd	30⅞	30	50	1⅜							29½	59½	9▲	27▲		3⅛	7⅛
7	TNE-4	4000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	20▲		(2)	(3)							
8	TWE-4	4000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	26½▲		(2)	(3)							
9	TNE-6	6000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	20▲		(2)	(3)							
10	TWE-6	6000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	26½		(2)	(3)							
11	TWH-4	4000		W	EM	Hyd	33¾	30	50	2⅛	30	60	27		6½	21							
12	TWH-6	6000		W	EM	Hyd	33¾	30	50	2⅛	30	60	27		6½	21							
13	ETWE-4	4000		R	EM	Hyd	29⅝	32		2½	36	72	26½		(2)	(3)							
14	EPE-4	4000		R	EM	Hyd	29½	32		1¼							30	60	9▲	27▲		3⅛	7⅛
15	Baker E-3	6000	3500	R	E-G	Hyd	70⅛	42¾	56½	4	55	84	26½	48	10⅝	16¼							
16	E-5	10000	4500	R	E-G	Hyd	71⅝	42¾	56½	4	60	96	26½	48	10⅝	16¼							
17	Barrett PO-40	4000	1625	W	EM	HE	38⅛	36	59⅛	1⅝	36	80	24¾		6½								
18	PO	4000	1132	W	EM	HE	32⅝	27¼	59⅛	3⅝	36	72	20		(2)	(6)							
19	POK	4000	1176	W	EM	HE	32⅝	27¼	59⅛	3⅝	36	72		25	(2)	(6)							
20	PX	4000	1145	W	EM	HE	33	27¼	59⅛	3⅝							30	60	9	27		3	7
21	STF-40	4000	1835	W	EM	HE	38⅛	52⅛	59⅛	1½							24	48	4	8	32	2	68
22	Buda CB-20	2000		R	GE		97†	40†	50	3													
23	Crescent PLA-4	4000		R	E-G	Hyd	110	38		4	48		24		7	20							
24	PLB-4	4000		R	E-G	Hyd	115	38		4	48		24		7	20							
25	KLB-10	10000		R	E-G	Hyd	130	42		4½	60		27		11	24							
26	Elwell-Parker EQ-4	4000	2100	R	EM	Mec	95¾†	31¼†	54¾	3	41	66	24	26½	10½	15							
27	EQ-4	4000	2100	R	EM	Mec	87¼†	31¼†	54¾	2⅝	41	60	18½	26½	7	10¼							
28	EP-4-11	4000	3150	R	EM	Mec	119⅞†	43†	56⅜	4	54	120	26½	36	10¾	16½							
29	EP-6	6000	3200	R	EM	Mec	119⅝†	42¾†	58	4	54	120	26½	36	10¾	16½							
30	GEP-6	6000	3900	R	GE	Hyd	125†	42¾†	58	4	54	120	26½	36	10¾	16½							
31	EW-6	6000	3450	R	EM	Mec	120½†	42¾†	58	10¼	54	108	26½	36	16½	22½							
32	EP-10	10000	3600	R	EM	Mec	129†	43†	59½	3¾	60	120	26½	40	11	16¾							
33	GEP-10	10000	4200	R	GE	Hyd	132†	42¾†	58	3⅞	60	120	26½	40	11	16¾							
34	EY-ZO	20000		R	EM	Hyd	146⅜†	45†	58	5	75		41		17½	23½							
35	L-13	20000		R	EM	Hyd	155¼†	48†	58	2½	72		26½		11¼	17¾							
36	L-12	20000		R	EM	Hyd	166½	50	58	2	96		36		11½	17							
37	L-3	30000		R	EM	Hyd	138½	56½	60	8	60		50		18	24							
38	L-14	40000		R	EM	Hyd	187	56½	60	6	96		41		17½	23½							
39	Hyster Pallet Truck	4000	1360	R	GE	Hyd	50	35	55	1							36	60	9●		27	3	7
40	Platform Truck	4000	1095	R	GE	Hyd	55	35	50	3	42	60	18	24	7	10½							
41	Platform Truck	4000	1135	R	GE	Hyd	55	35	50	3	42	60	18	24	9	12½							
42	Kalamazoo 301	800	1000	R	GE	Hyd	63¼	33½	45	4							18	25	3▲	6	32	¾	18¼
43	Lewis-Shepard M4P	4000	1890	R	EM	Hyd	29⅞	42	60	1							36	60	9¼▲	25	36	3¼	7¼
44	M4N	4000	1790	R	EM	Hyd	21⅜	42	60	2	36	72	18		(10)	(11)							
45	M4W	4000	1790	R	EM	Hyd	21⅜	42	60	3	30	72		36	(10)	(11)							
46	E4P	4000	1050	W	EM	Hyd	33	32	54	1							32	60	9¼▲	25	36	3¼	7¼
47	E6P	6000	1250	W	EM	Hyd	33	32	54	1							32	60	9¼▲	25	36	3¼	7¼
48	E4TP	4000	1000	W	EM	Hyd	33	32	54	1							24	42	6▲	16		3¼	7¼
49	E4N	4000	(15)	W	EM	Hyd	25⅝	32	54	2	36	72	18		(10)	(11)							
50	E4W	4000	(15)	W	EM	Hyd	25⅝	32	54	3	30	72		36	(10)	(11)							
51	E6N	6000	(15)	W	EM	Hyd	25⅝	32	54	2	36	72	18		(10)	(11)							
52	E6W	6000	(15)	W	EM	Hyd	25⅝	32	54	3	30	72		36	(10)	(11)							
53	Lift Trucks KNS	6000	1300	W	EM	Hyd	31¾	32¾	50¾		36	72	18	20	(2)	(3)							
54	KMS	6000	1400	W	EM	Hyd	31¾	32¾	50¾		36	72	21	25	(2)	(3)							
55	KWS	6000	1600	W	EM	Hyd	31¾	32¾	50¾		36	72	26¾		(2)	(3)							
56	KPNS	4000	1200	W	EM	Hyd	33⅝	32¾	50¾	¾							30	60	8½▲	22	26	3¼	7¼
57	KPWS	4000	1300	W	EM	Hyd	33⅝	32¾	50¾	¾							30	60	10▲	27		3¼	7¼
58	Market Forge Skid Lift Truck	6000	(16)	W	E-G	Hyd	43	(18)	45	(19)	30	72	18	26	(2)	(20)							
59	Pallet Lift Truck	6000	(17)	W	E-G	Hyd	43	28	45	1¼							30	72	11▲	28	28	(21)	7¼
60	Mercury A-1007	3000	2100	R	EM	Hyd	56	33¾		2⅛			18		7	18							
61	A-1007	4000	2300	R	EM	Hyd	56	33¾		2⅛			18		7	18							
62	A-1017	4000	3200	R	EM	Hyd	60	41½		4⅛			24		11	23							
63	A-1020	6000	3400	R	EM	Hyd	60	41½		4⅛			24		11	23							
64	A-1011	10000	4500	R	EM	Hyd	69½	42		3 1/16			26⅝		11 1/16	22							
65	Moto-Truc PAL	(26)	850	W	EM	Hyd	28	27	50	3							24	72	9●	22	27	3¼	7¼
66	PAL-SC	(26)	850	W	EM	Hyd	24	27	50	1½							24	72	9●	22	27	3¼	7¼
67	PAL-R	4000	900	R	EM	Hyd	33½	31		1½							24	72	9●	22	27	3¼	7¼
68	MTP	(27)	800	W	EM	Hyd	24	27	50	3½	36	72	18	26	3½	(10)							
69	Raymond EL4P	4000	1360	R	EM	Hyd	30⅛	34	55	2	30	48	18	24	(2)	(20)							
70	EL4F	4000	1410	R	EM	Hyd	30	34	55	1½							30	48	9¼▲	24	30	3¼	7¼
71	Towmotor W	4000	920	W	EM	Hyd	30	(28)	46	1							30	72	9▲	27▲		3¼	7¼

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS

A multitude of variations are available from any of the companies listed.

ENGINE OR MOTOR		BATTERY		SPEEDS With Capacity Load		GRADABILITY (Per Cent)			WHEELS						
									Drive		Fork				
Make and Model	Horsepower	Normal Voltage	Ampere Hours	Truck (mph.)	Time of Lift (sec.)	Unloaded	Capacity Load	Dead Man Brake	Number	Diameter (In.)	Set Tandem	Number in Each Fork or Trail	Diameter (In.)	Line Number
Own 1175	5	30	306	4¾	1.0	30	20	Y	.....	.....	.....	.....	.....	1
Own	.....	30	.....	5.4	3.4	.....	.....	Y	2	22x4½	N	2	9x5	2
Own	.....	(1)	.....	4.0	4.2	.....	.....	Y	2	20x6	N	2	10x6	3
Own	.....	36	.....	5.5	3.8	.....	.....	Y	2	20x6	N	2	10x6	4
Own	.....	12	.....	.....	.....	.....	.....	Y	1	10x5	D	2	3⅛	5
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	D	2	3⅛	6
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	N	2	(4)	7
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	N	2	(4)	8
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	N	2	(4)	9
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	N	2	(4)	10
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	N	2	5½x4½	11
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	N	2	5½x4½	12
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	2	10x4	N	2	(4)	13
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	2	10x4	D	2	3⅛	14
Own 2460	8	36	450	4.8	4.0	10	8	Y	2	22x6	N	2	10x6	15
Own 2480	8	36	500	4.0	6.0	10	8	Y	2	22x6	Y	4	10x6	16
Own	1	12	(5)	2.0	60.0	10	6	Y	1	10	N	1	6	17
Own	1	12	(5)	2.5	6.0	28	10	Y	1	10	N	2	(2)	18
Own	1	12	(5)	2.5	6.0	28	10	Y	1	10	N	2	(2)	19
Own	1	12	(5)	2.5	4.0	25	9	Y	1	10	N	1	3	20
Own	1	12	(5)	2.0	60.0	10	6	Y	1	10	N	1	6	21
Wis TF	13⅓	.....	.....	10.0	.....	.....	12	Y	2	16¾	.....	1	16¾	22
Kim 345B	.....	32	450	5.5	20	15	10	Y	2	16	Y	2	6½	23
Kim 345B	.....	32	500	5.5	20	15	10	Y	2	16	Y	2	6½	24
Kim 345B	.....	32	500	4.0	15	15	10	Y	.....	.....	Y	2	6½	25
Own	.....	(7)	.....	4.0	2½	.....	.....	Y	2	15x5	N	2	9x5	26
Own	.....	(7)	.....	4.0	2½	.....	.....	Y	2	15x5	Y	4	6½x4½	27
Own	.....	(8)	.....	4.8	4	.....	.....	Y	2	22x4½	N	2	10x6	28
Own	.....	(8)	.....	4.8	4	.....	.....	Y	2	22x6	N	2	10x6	29
Her F-162	34	.....	.....	.....	.....	.....	.....	Y	2	22x6	N	2	10x6	30
Own	.....	(8)	.....	4.0	4	.....	.....	Y	2	22x6	N	2	15x5	31
Own	.....	36	.....	4.5	5	.....	.....	Y	2	22x6	Y	4	10x6	32
	.....	.....	.....	6.5	6	.....	.....	Y	2	22x6	Y	4	10x6	33
Own	.....	(9)	.....	3.0	7	.....	.....	Y	2	22x6	Y	4	15x8½	34
Own	.....	60	.....	3.0	7	.....	.....	Y	2	22x7	T	6	10x6	35
Own	.....	60	.....	2.5	8	.....	.....	Y	2	22x7	Q	8	10x6	36
Own	.....	60	.....	2.5	7	.....	.....	Y	2	22¾x10	Y	4	15x4	37
Own	.....	60	.....	3.0	7	.....	.....	Y	2	22x10	T	6	15x10	38
Wis AKN	6	.....	.....	8.0	.....	.....	9	N	1	16¼	N	1	3	39
Wis AKN	6	.....	.....	8.0	.....	.....	9	N	1	16¾	N	2	6	40
Wis AKN	6	.....	.....	8.0	.....	.....	9	Y	1	16¾	N	2	9	41
Wis AEN	7½	.....	.....	6.0	.....	.....	20	N	2	16	N	.....	16	42
General Electric	.....	12	(12)	3.8	6	20	6¾	Y	1	10½	N	1	3¼	43
General Electric	.....	12	(12)	3.4	6	20	6¾	Y	1	10½	N	1	(10)	44
General Electric	.....	12	(12)	3.4	6	20	6¾	Y	1	10½	N	1	(10)	45
Auto-Lite	.....	12	(14)	3.0	6	44	10¾	Y	1	10½	N	1	3¼	46
Auto-Lite	.....	12	(14)	2.8	9	44	7½	Y	1	10½	N	1	3¼	47
Auto-Lite	.....	12	(14)	3.0	6	44	10¾	Y	1	10½	N	1	3¼	48
Auto-Lite	.....	12	(14)	3.0	6	44	10¾	Y	1	10½	.....	2	(10)	49
Auto-Lite	.....	12	(14)	3.0	6	44	10¾	Y	1	10½	.....	2	(10)	50
Auto-Lite	.....	12	(14)	2.8	9	44	7½	Y	1	10½	.....	2	(10)	51
Auto-Lite	.....	12	(14)	2.8	9	44	7½	Y	1	10½	.....	2	(10)	52
Bal 183-D	1	12	300	2.0	.....	.....	.....	N	2	10	N	.....	.....	53
Bal 183-D	1	12	300	2.0	.....	.....	.....	N	2	10	N	.....	.....	54
Bal 183-D	1	12	300	2.0	.....	.....	.....	N	2	10	N	.....	.....	55
Bal 182-D	¾	12	300	2.0	.....	.....	.....	N	2	10	N	(13)	3¼	56
Bal 182-D	¾	12	300	2.0	.....	.....	.....	N	2	10	N	(13)	3¼	57
Bal 183-D	1	12	(22)	4.0	10	20	10	Y	1	10½x7	.....	.....	.....	58
Bal 183-D	1	12	(22)	4.0	10	20	10	Y	1	10½x7	Y	6	3¼x2	59
Own	.....	(23)	(24)	4.3	2	.....	.....	Y	2	16	N	2	6½	60
Own	.....	(23)	350	4.3	2	.....	.....	Y	2	16	Y	4	6½	61
Own	.....	(23)	450	4.5	3	.....	.....	Y	2	20	N	2	10½	62
Own	.....	(23)	(25)	4.5	3	.....	.....	Y	2	20	N	2	10½	63
Own	.....	(23)	(25)	4.0	3	.....	.....	Y	2	20	Y	4	10½	64
.....	.....	12	.....	2.8	3½	.....	.....	Y	1	9	.....	1	3¼	65
.....	.....	12	.....	2.8	3½	.....	.....	Y	1	9	.....	1	3¼	66
.....	.....	18	.....	3.5	4½	.....	.....	Y	1	10½	.....	1	3¼	67
.....	.....	12	.....	2.8	3½	.....	.....	Y	1	9	.....	.....	.....	68
Gen 5BT-1322A27	1½	12	400	3.5	3	8	12	Y	1	10	.....	.....	.....	69
Gen 5BT-1322A27	1½	12	400	3.3	3	7	10	Y	1	10	D	2	3¼	70
.....	¾	12	(29)	2.2	5	25	4¾	Y	1	9⅜x5x5	Y	(30)	3¼	71

ABBREVIATIONS

•—Including battery.
†—Including platform.
▲—Standard.
●—Maximum.
▲—Minimum.
(1)—30 to 36.
(2)—6, 7, 9 or 11.
(3)—9½, 10½, 12½ or 14½.
(4)—5½, 6½, 8 or 10 x 5.
(5)—250 to 450.
(6)—12, 13, 15 or 17.
(7)—24 to 30.
(8)—32 to 36.
(9)—48 to 60.
(10)—6 or 11.
(11)—10 or 15.
(12)—450 to 540.
(13)—1 or 2.
(14)—300 to 360.
(15)—1000 to 1200.
(16)—900 to 1650 depending on length.
(17)—1100 to 1700 depending on length.
(18)—18 to 26.
(19)—3, 4, 5 or 6.
(20)—10, 11, 13 or 15.
(21)—3¼ adjustable to 4½.
(22)—340 to 500.
(23)—28 to 30.
(24)—300 to 350.
(25)—450 to 550.
(26)—4000 and 6000.
(27)—4000 to 10,000
(28)—27 with lead acid battery; 29 with alkaline battery.
(29)—250 to 440.
(30)—Two standard; one for forks under 36".
(31)—2¼ to 3¼.
(32)—6⅜, 7, 9 or 11.
(33)—2¼ to 2⅝.
AL—Electric Auto-Lite Co.
Bal—Baldor Co.
D—Dual.
E-G—Electric or gas-electric.
EM—Electric motor.
GE—Gasoline engine.
Gen—General Electric Co.
HE—Hydraulic electric.
Her—Hercules Motor Co.
Hyd—Hydraulic.
Kim—Star Kimble Co.
Lin—Linkage.
Mec—Mechanical.
N—No or none.
Q—Quad.
R—Rides.
T—Triple.
Var—Variable.
W—Walks.
Wis—Wisconsin Motor Co.
Y—Yes.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

POWERED LOW-LIFT FORK

Line Number	MAKE AND MODEL	Maximum Load Capacity (lbs.)	Service Weight (lbs.)—Excluding Battery	Operator—Walks or Rides	Motive Power	Lifting Power	OVERALL CHASSIS DIMENSIONS (Ins.)				PLATFORM DIMENSIONS (Ins.)						FORK DIMENSIONS (Ins.)						
							Length—Excluding Platform or Forks	Width	Height—To Top of Controls	Lowest Underclearance	Length		Width		Height Above Ground		Length		Width of Face	Lateral Outside Overall Width		Height Above Ground	
											Minimum	Maximum	Minimum	Maximum	Lowered	Elevated	Minimum	Maximum		Minimum	Maximum	Lowered	Elevated
72	Yale & Towne KM4L	4000	2160	R	E-G	Lin	54¼	32¼	52	2¼	Var	Var	Var	Var	6¾	10¾							
73	K23E4	4000	3300	R	E-G	Lin	64	44½	56	4⅝	Var	Var	Var	Var	11	17							
74	K23E8	6000	3850	R	E-G	Lin	64	44½	56	4⅝	Var	Var	Var	Var	11	17							
75	K26S10	10000	4525	R	E-G	Lin	69	47	58	4½	Var	Var	Var	Var	11¼	17							
76	K26S16	16000	5800	R	E-G	Lin	62½	45	60	4½	Var	Var	Var	Var	11¼	17							
77	K26G20L	20000	10475	R	E-G	Lin	81¾	60	68	3¾	Var	Var	Var	Var	11¼	17							
78	K35-6	6000	3650	R	E-G	Lin	64¾	44½	56	8	Var	Var	Var	Var	17	23							
79	K26G20H	20000	.....	R	E-G	Lin	.....	60	66	5½	Var	Var	Var	Var	17	23							
80	M4	4000	1140	W	E-G	Hyd	34¼	31	50	(31)	30	96	18	38	(2)	(20)							
81	M6	6000	1200	W	E-G	Hyd	34¾	31	50	(31)	30	96	18¼	38¼	(32)	(20)							
82	M4UW	4000	1735	W	E-G	Hyd	40½	31	50	3¼	36	60	26	26	6	19							
83	M6UW	6000	1815	W	E-G	Hyd	40½	31	50	3¼	36	60	26¼	28¼	6	19							
84	M4P	4000	1085	W	E-G	Hyd	37½	31	50	2¾	.....	.....	.....	.....	.....	.....	30	84	9¼▲	25	48	3½	7½
85	M6P	6000	1120	W	E-G	Hyd	37½	31	50	.....	.....	.....	.....	.....	.....	.....	30	84	9⅝▲	25	48	3½	7½
86	MS1	4000	1020	W	EM	Hyd	28	31	50	(33)	30	96	18	38	(2)	(20)							
87	MS6	6000	1060	W	EM	Hyd	28	31	50	(33)	30	96	18¼	38¼	(32)	(20)							
88	MS1P	4000	1120	W	EM	Hyd	31½	31	50	.....	.....	.....	.....	.....	.....	.....	30	84	9¼▲	25	48	3¼	7¼
89	MS6P	6000	1150	W	EM	Hyd	31½	31	50	.....	.....	.....	.....	.....	.....	.....	30	84	9⅝▲	25	48	3¼	7¼
90	M4TP	4000	1000	W	E-G	Hyd	38	31	50	2¼	.....	.....	.....	.....	.....	.....	24	36	5⅝▲	16	27	3¼	6¼

POWERED NON-LIFT

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Rated Capacity (lbs.)	Service Weight (lbs.)	OPERATOR		Motive Power	Frame Type	Controls & Steering	OVERALL TRUCK DIMENSIONS (Ins.)				PLATFORM DIMENSIONS (Ins.)			No. of Drive Wheels	No. of Steering Wheels	TIRES			
				Rides or Walks	Sits or Stands				Width	Length	Height	Wheelbase	Length	Width	Height from Ground			ON DRIVE WHEELS		STEERING WHEELS	
																		Type	Size	Type	Size
1	Atlas HP-3	6000	3800	R	.....	EM	.....	.....	46	111	50	55	90	46	25½	.....	.....	.....	.....	.....	.....
2	3-LWH	6000	3900	R	.....	E-G	.....	.....	42	116½	50	60	60	42	11	.....	.....	.....	.....	.....	.....
3	Automatic FP-20	2000	1935	R	S	EM	Str	1	40	109	.....	60	60½	40	14¾	2	1	Cu	14x4½	Cu	14x4½
4	HN-2	4000	3730	R	St	EM	Str	1	39	114½	.....	65	64	38	12¾	2	4	So	22x4½	So	10x6
5	HN-3	6000	4700	R	St	EM	Str	1	41	118½	.....	65	64	41	12¾	2	4	So	20x6	So	10x6
6	EN-2	4000	4000	R	St	EM	Str	1	46	105¾	.....	55	84	46	24	2	4	So	22x4½	So	22x4½
7	EN-3	6000	4255	R	St	EM	Str	1	45	107	.....	53	84	45	22¾	2	4	So	20x5	So	20x5
8	Crescent PDB-4	4000	4800	R	St	EM	Dr	1	42	118½	52⅝	67	80	42	12	2	4	SC	20x4x16	So	10½x5x6½
9	RDB-6	6000	5600	R	St	EM	Dr	1	42	118½	52⅝	67	80	42	12	2	4	SoC	20x4x16	So	10½x5x6½
10	RSE-10	10000	3900	R	St	EM	Str	1	42	112½	53⅝	66½	90	42	26	2	4	SoC	22x6x16	SoC	22x8x16
11	Elwell-Parker FH-8	6000	2900	R	St	E-G	Str	1	42¾	124¾	58	60	84	41	12¼	2	4	So	22x6	So	10x6
12	WH-8	6000	2975	R	St	E-G	Str	1	42⅞	146½	58	78	86	41	17¼	2	4	So	22x6	So	15x6
13	IE	6000	2475	R	St	E-G	Str	1	40	111¾	58¼	60	84	40	25	2	4	So	20x3½	So	20x5
14	SE	4000	2650	R	St	E-G	Str	2	45	150	84	83½	138¾	44	34	2	4	So	27x3½	So	27x3½
15	Getman G-7	3000	1200	R	S	GE	Str	1	51	96	58	53	48	26	.....	2	1	P	7.50/10	P	7.50/10
16	N45	2000	800	R	S	GE	Str	1	31	70	58	38	38	23	.....	2	1	P	5.00/8	P	5.00/8
17	N52	2500	1100	R	S	GD	Str	1	43	94	58	54	44	26	.....	2	1	P	7.50/10	P	7.50/10
18	N70	3500	1400	R	S	GD	Str	1	51	102	58	58	44	26	.....	2	1	P	7.50/10	P	7.50/10
19	Hyster Cargo Truck	4000	1510	R	St	GE	Str	1	42	103½	58	73½	80	42	7⅛	1	2	Cu	16¼x4	So	8x8
20	Kalamazoo 2500	3500	1150	R	.....	GE	Str	1	42	96	48	59¼	54	42	18½	2	1	P	5.80/16	P	5.80/16
21	Kwik-Mix Moto-Bug 3A	1500	875	R	St	GE	Str	1	32	80½	43	32¾	48	32	20½	2	2	P	5.00/16	So	13x13½
22	Market Forge Freight Truck	6000	950*	R	Sst	E-G	Str	1	36	92¼	45	55½	57	36	13⅜	1	1	Cu	10½x7	Cu	10x5
23	Mercury A-823	2000	1250*	R	S	EM	Str	1	40	111¼	51½	63	(5)	40	22	2	1	PC	(6)	PC	(7)
24	A-1014	4000	2700*	R	St	EM	Str	1	46	112	56	61	89	46	27½	2	2	So	20x4	So	20x4
25	A-1014	6000	2800*	R	St	EM	Str	1	46	112	56	61	89	46	27½	2	2	So	20x5	So	20x5
26	A-1015	4000	2600*	R	St	EM	Dr	1	41	120⅛	56	71	72	41	11⅛	2	2	So	20x4	So	10½x5
27	A-1015	6000	2700*	R	St	EM	Dr	1	41	120⅛	56	71	72	41	11⅛	2	2	So	20x5	So	10½x6
28	Rocky Mountain B	2000	900*	R	S	EM	Str	1	40	96	42	53	61½	40	18	2	2	Se	12x2	So	14x2½
29	O	2000	900*	R	St	EM	Str	1	36	93	48	48	59½	36	18	2	2	So	12x2	So	14x2½
30	Whiteman UPB	2000	1050	R	S	GE	Str	1	44	108	48	54	63	44	19	2	2	P	4.00/8	P	4.00/8
31	Yale & Towne K20-6	6000	2535	R	St	E-G	Str	1	42	108⅜	51	61	86¾	42	25½	2	4	Cu	20x5	Cu	20x5
32	FM20	2000	1225	R	S	E-G	Str	1	40	96	.....	62	96	42	22	2	1	PC	18x5¾	PC	18x5¾
33	K32	4000	3300	R	St	E-G	Str	2	45	176	84	126½	148	45	(12)	2	4	So	27x3½	So	27x3½
34	K36	4000	3300	R	St	E-G	Dr	2	45	176	84	126½	148	45	34	2	4	So	27x3½	So	27x3½

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

OR PLATFORM TRUCKS—*concluded*

ENGINE OR MOTOR			BATTERY		SPEEDS With Capacity Load		GRADABILITY (Per Cent)			WHEELS					
										Drive		Fork			
Make and Model		Horsepower	Normal Voltage	Ampere Hours	Truck (mph)	Time of Lift (sec)	Unloaded	Capacity Load	Dead Man Brake	Number	Diameter (In)	Set Tandem	Number In Each Fork or Trail	Diameter (In)	Line Number
Electric Specialty					5.5	2		10	Y	2	18				72
Electric Specialty					5.0	2¼		10	Y	2	20				73
Electric Specialty					5.0	2½		10	Y	2	20				74
Electric Specialty					4.5	4		10	Y	2	20				75
Electric Specialty					4.0	5		10	Y	2	20				76
Electric Specialty					5.5	5½		10	Y	2	22				77
Electric Specialty					5.0	3½		10	Y	2	20				78
Electric Specialty					5.0	3½		10	Y	2	22				79
AL	MCP4002	1	12	450	2.0	5		5	Y	1	10½				80
AL	MCP4002	1	12	450	2.0	5		3¾	Y	1	10½				81
AL	MCP4002	1	12	450	2.0	7		5	Y	1	10				82
AL	MCP4002	1	12	450	2.0	7		3¾	Y	1	10				83
AL	MCP4002	1	12	450	2.0	5		5	Y	1	10	N	2	3½	84
AL	MCP4002	1	12	450	2.0	5		3¾	Y	1	10½	N	2	3¼	85
AL	MCP4002	1	12	250	2.0	5		5	Y	1	10½				86
AL	MCP4002	1	12	250	2.0	5		3¾	Y	1	10½				87
AL	MCP4002	1	12	250	2.0	3		5	Y	1	10½	N	2	3½	88
AL	MCP4002	1	12	250	2.0	3		3¾	Y	1	10½	N	2	3¼	89
AL	MCP4002	1	12	450	2.0	4			Y	1	10x5	Y	2	3¼	90

ABBREVIATIONS

*—Standard.
(2)—6, 7, 9 or 11.
(20)—10, 11, 13 or 15.
(31)—2¼ to 3¼.
(32)—6½, 7, 9 or 11.
(33)—2¼ to 2¹¹⁄₁₆.
AL—Electric Auto-Lite Co.
E-G—Electric or gas-electric.
EM—Electric motor.
Hyd—Hydraulic.
Lin—Linkage.
N—No or none.
R—Rides.
Var—Variable.
W—Walks.
Y—Yes.

PLATFORM TRUCKS

A multitude of variations are available from any of the companies listed.

TURNING RADIUS				MOTOR OR ENGINE		BATTERY		SPEEDS						GRADABILITY Per Cent		
										TRUCK						
										Unloaded		Loaded				
Inside (In.)	Outside (In.)	Intersecting Aisle Width (In.)	Dead Man Brake	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward	No. of Reverse	Forward (mph)	Reverse (mph)	Forward (mph)	Reverse (mph)	Unloaded	Capacity Load	Line Number
.....	93	68	Y	Own.....1175	5	30	306	3	3	6.0	6.0	4.5	4.5	33	21	1
.....	92	66	Y	Own.....1175	5	30	306	3	3	6.0	6.0	4.5	4.5	33	21	2
24	90	68	Y	Auto-Lite.....	1½	24	.....	3	3	5.5	5.5	5.0	5.0	.....	.....	3
50	102	84	Y	Own.....	.....	30	.....	4	4	6.0	6.0	5.1	5.1	.....	.....	4
46	103	69	Y	Own.....	.....	30	.....	4	4	6.5	6.5	4.7	4.7	.....	.....	5
41	98	69	Y	Own.....	.....	30	.....	4	4	6.0	6.0	5.1	5.1	.....	.....	6
41	100	68	Y	Own.....	.....	30	.....	4	4	6.5	6.5	4.7	4.7	.....	.....	7
100	.....	68	Y	Kim.....345B	.....	(1)	450	4	4	6.0	6.0	5.0	5.0	15	10	8
100	.....	68	Y	Kim.....345B	.....	(1)	450	4	4	6.0	6.0	5.0	5.0	15	10	9
101	.....	67	Y	Kim.....345B	.....	(2)	500	4	4	6.0	6.0	5.0	5.0	15	10	10
45	105	70	Y	Own.....	.....	.....	.....	4	4	5.5	5.5	4.0	4.0	.....	.....	11
61	123	78	Y	Own.....	.....	.....	.....	4	4	6.0	6.0	4.5	4.5	.....	.....	12
45	101	69	Y	Own.....	.....	.....	.....	4	4	6.0	6.0	4.0	4.0	.....	.....	13
71	138	89	Y	Own.....	.....	.....	.....	4	4	6.0	6.0	3.0	3.0	.....	.....	14
60	.....	.....	Y	Wis.....AEN	8¼	.....	.....	4	1	15.0	4.0	7.0	4.0	20	20	15
40	.....	.....	Y	Wis.....AEN	8¼	.....	.....	1	1	6.0	6.0	5.0	5.0	20	20	16
58	.....	.....	Y	Wis.....AEN	8¼	.....	.....	4	1	15.0	4.0	7.0	4.0	20	20	17
60	.....	.....	Y	Wis.....AEN	14½	.....	.....	4	1	20.0	6.0	14.0	6.0	25	25	18
0	89	72	N	Wis.....AKN	6	.....	.....	V	V	12.0	12.0	8.0	8.0	32	9	19
5½	79½	.....	Opt	Wis.....TF	13	.....	.....	3	1	15.0	3.0	15.0	3.0	.....	.....	20
.....	61	54	Y	Wis.....AKN	6	.....	.....	1	1	4.7	4.7	4.5	4.5	25	20	21
3	74	48	Y	Bal.....183-D	1	.....	(3)	(4)	(4)	5.0	5.0	4.0	4.0	20	10	22
.....	82	.....	Y	Own.....	.....	(8)	(9)	3	3	8.0	8.0	6.5	6.5	.....	.....	23
.....	97	69	Y	Own.....	.....	(8)	(10)	3	3	6.0	6.0	4.5	4.5	.....	.....	24
.....	97	69	Y	Own.....	.....	(8)	450	3	3	6.0	6.0	4.5	4.5	.....	.....	25
.....	108	89	Y	Own.....	.....	(8)	(10)	3	3	6.0	6.0	4.5	4.5	.....	.....	26
.....	108	89	Y	Own.....	.....	(8)	450	3	3	6.0	6.0	4.5	4.5	.....	.....	27
.....	105	84	Y	.....	.....	(11)	.....	4	4	8.5	8.5	.....	.....	.....	.....	28
.....	95	75	N	.....	.....	(11)	.....	4	4	8.0	8.0	.....	.....	.....	.....	29
.....	108	72	N	Glad.....75	7½	.....	.....	V	V	16.0	16.0	13.0	13.0	16	10	30
47	104	67	Y	Electric Specialty	.....	.....	.....	4	4	6.0	6.0	5.0	5.0	15½	15½	31
.....	83	66	Y	Electric Specialty	.....	.....	.....	4	4	9.0	9.0	8.0	8.0	7¾	7¾	32
102	168	94	Y	Electric Specialty	.....	.....	.....	4	4	7.0	7.0	6.0	6.0	8	7	33
102	168	94	Y	Electric Specialty	.....	.....	.....	4	4	7.0	7.0	6.0	6.0	8	7	34

ABBREVIATIONS

*—Without battery.
(1)—16 to 19.
(2)—18 to 21.
(3)—340 to 500.
(4)—Two standard; three optional.
(5)—61½ to 88.
(6)—4.00/12 or 21x5.
(7)—5.00/8 or 17x4½.
(8)—28 to 30.
(9)—225 to 250.
(10)—300 to 450.
(11)—24 to 32.
(12)—11 and 34.
Bal—Baldor Co.
Cu—Cushion.
Dr—Drop.
E-G—Electric or gas-electric.
EM—Electric motor.
GD—Gasoline or diesel engine.
GE—Gasoline engine.
Glad—Gladden Motor Co.
Kim—Star Kimble Co.
N—No or none.
Opt—Optional.
P—Pneumatic.
PC—Pneumatic or cushion.
R—Rides.
S—Sits.
SC—Solid and cushion.
So—Solid.
SoC—Solid or cushion.
Sst—Sits or stands.
St—Stands.
Str—Straight.
V—Various.
Wis—Wisconsin Motor Co.
Y—Yes.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

DA INDUSTRIAL TRUCK SPECIFICATIONS—1954-55

INDUSTRIAL TRUCKS—

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Drawbar Pull (lbs)	Trailing Load—Dry Level Concrete (Tons)	Weight—Excluding Battery	OPERATOR: Rides or Walks	OPERATOR: Sits or Stands	Motive Power	MOTOR OR ENGINE: Make and Model	MOTOR OR ENGINE: Horsepower	BATTERY: Normal Voltage	BATTERY: Ampere Hours	DIMENSIONS: Wheelbase	Length—Overall	Width—Overall	Height, to Steering Wheel	Underclearance: At Truck Center	Underclearance: Lowest Point	3 or 4 Point Suspension
1	Atlas 2-WT-2	2500	50	4900*	R		E-G	Own 1175	5	48	306	45½	72	42	60		7½	4
2	3-DWT-2	2100	40	4025*	R		E-G	Own 1175	5	36	306	45½	72	42	60		7½	3
3	Automatic FT	250	7	785*	R	S	EM	Auto-Lite	1½	24		30	46½	29	51¾	3¾		3
4	FT-E	250	7	855*	R	St	EM	Auto-Lite	1½	24		25	52	29		3¾		3
5	BTN	600	17	4650*	R	S	EM	Own		36		41	68	36		6		3
6	MN	725	20¾	5300*	R	S	EM	Own		48		40	75½	48	57	3⅝		4
7	BTW	600	17	5840*	R	S	EM	Own		36		67		42		6		4
8	TR	100	2¾	1080	W		EM	Auto-Lite	1½	12		23½	38¾	30	50	2⅝		3
9	TRH	200	5¼	1640	W		EM	Auto-Lite	1½	12		31	47⅞	32	54	2⅝		3
10	TRLE	100	2¾	840	W		EM	Auto-Lite	1½	12		37⅝	49⅜	30	50	2⅝		3
11	Barrett CTX	200	5	1400	RW	St	EM	Own	1	24	(1)	29⅛	46½	28¼	55½	3½	3	3
12	RTX	700	10	940	R	S	EM	Own	1	12	(2)	24	41⅝	27¼	43⅞	3½	3	3
13	STX	200	5	1400	R	St	EM	Own	1	24	(1)	29⅛	46½	28¼	55½	3½	3	3
14	TX	700	10	910	W	St	EM	Own	1	12	(2)	24	41⅝	27¼	59½	3½	3	3
15	Buda HB-75	7500		12200	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
16	HB-90	9000		13200	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
17	HA-75	7500		12400	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
18	HA-90	9000		13400	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
19	HB-120	12000		15780	R	S	GE	Own 6B-230	74			72	125½	86	66	14		4
20	HA-120	12000		15980	R	S	GE	Own 6B-230	74			72	125½	86	66	14		4
21	T6-24	2400		3250	R	S	GE	Own 4B-153	49			45	81¾	42	62	8¾		4
22	TD-24	2400		3350	R	S	DE	Own 4BD-153	40			45	81¾	42	62	8¾		4
23	T6-30	3000		4200	R	S	GE	Own 4B-153	49			45	81¾	42	62	8¾		4
24	TD-30	3000		4300	R	S	DE	Own 4BD-153	40			45	81¾	42	62	8¾		4
25	JG230	4500		5735	R	S	GE	Own 6B-230	74			62	102	66	61	9½		4
26	JD230	4500		5880	R	S	DE	Own 6BD-230	60			62	102	66	61	9½		4
27	JG230N	3000		4125	R	S	GE	Own 6B-230	74			62	102	58	61	9½		4
28	JD230N	3000		4270	R	S	DE	Own 6BD-230	60			62	102	58	61	9½		4
29	JG230P	3000		4055	R	S	GE	Own 6B-230	74			62	102	58	61	9½		4
30	JD230P	3000		4200	R	S	DE	Own 6BD-230	60			62	102	66	61	9½		4
31	JG230WN	4500		6275	R	S	GE	Own 6B-230	74			62	102	66	61	9½		4
32	JD230WN	4500		6420	R	S	DE	Own 6BD-230	60			62	102	66	61	9½		4
33	JG230WL	5000		6455	R	S	GE	Own 6B-230	74			85	125	58	66	8		4
34	JD230WL	5000		6600	R	S	DE	Own 6BD-230	60			85	125	58	66	8		4
35	JG230PLS	3800		4815	R	S	GE	Own 6B-230	74			92	142	64	63	8		4
36	JD230PLS	3800		4960	R	S	DE	Own 6BD-230	60			92	142	64	63	8		4
37	JG230PLD	4400		5635	R	S	GE	Own 6B-230	74			92	154	64	65	8		4
38	JD230PLD	4400		5780	R	S	DE	Own 6BD-230	60			92	154	64	65	8		4
39	Clark CKE-5	500	10	1850	RW		GE	Con N-62	15			34	62⅝	29	54¼	6⅜	2¼	3
40	CK-20	2000	40	3200	R		GE	Con Y-112	30			40	68	39	54½	8⅝	3½	4
41	CK-26	2600	52	3400	R		GE	Con Y-112	30			40	68	39	54½	8⅝	3½	4
42	CT-21	2100	42	3085	R		GE	Chr IND-5	61			57	94	52	58½	11	5¼	4
43	CT-30	3000	60	3685	R		GE	Chr IND-5	61			59	100	52	57	11	5¼	4
44	CT-40	4000	80	4735	R		GE	Chr IND-5	61			59	100	65½	57	11	5¼	4
45	CT-46	4600	92	6200	R		GE	Chr IND-5	61			59	100	65½	57	11	5¼	4
46	CT-120	12000	240	15500	R		GE	Chr 16-A	114			69	122½	92	54	8¼	7	4
47	Crescent JW-1.5	1500	5	1600	R	S	EM	Star Kimble		32	Var	32	56	33	51	6	6	4
48	JW-2	2000	7½	2800	R	S	EM	Star Kimble		36	Var	40	68	40	61½	6	6	4
49	MW-3	3000	10	3200	R	S	EM	Star Kimble		36	Var	45	79	42	61½	6	6	4
50	MW-4	4000	14		R	S	EM	Star Kimble		36	Var					6	6	4
51	Getman G-7	1200			R	S	GE	Wis AEN	8¼			54	96	51	58	5½	5½	3
52	Hyster Tug	543	27¼	1180	R	St	GE	Wis AKN	6			36	74	42	50	6	6	3
53	Kalamazoo 3600	1200	20	1850	R		GE	Wis TF	13			51¼	84	42	48	7½	3	3
54	Lewis-Shepard J	600	6	1450	R	S	EM	General Electric		12	(3)	29⅜	48¾	32	51¾	3	3	3
55	E6T	750	7½	1800	RW	St	EM	Auto-Lite		12	(3)	30	44½	32	54	3	3	3
56	Lift Trucks KT	(4)		1200	W		EM	Bal 182-D	¾	12	306	24½	42	26½	50¾	2¾	2¾	4
57	KTS	(4)		1150	W		EM	Bal 182-D	¾	12	300	19¼	36¾	32¾	50¾	2¾	2¾	4
58	KTRS	(4)		1400	W		EM	Bal 182-D	¾	12	300	27½	45	32¾	44	2¾	2¾	4
59	Market Forge ST-1000	1000	10	825	R	S	E-G	Bal 183-D	1	12	(5)	25¼	48	30	45	5½	1¾	3
60	UT-1000	1000	10	825	R	St	E-G	Bal 183-D	1	12	(5)	38½	58½	30	45	4	1¾	
61	Mercury A-440	2300	60	3000	R	S	GE	Wau FC-90	17			41⅝	70¾	40	56	10	4	3
62	A-440	2600	65	3600	R	S	GE	Wau FC-90	17			41⅝	70¾	40	56	10	4	3
63	A-452	4000	100	4800	R	S	GE	Chr 8A-114	70			60	102	50	66	11	9	4
64	A-452	5000	125	6000	R	S	GE	Chr 8A-114	70			60	102	67	66	10	9	4
65	A-460	2400	60	3200	R	S	GE	Waukesha	30			40	78	41	56	7¼	4	4
66	A-460	3000	75	4000	R	S	GE	Waukesha	30			40	78	41	56	7¼	4	4
67	A-540	2000		2400	R	S	EM	Own		36	450	45	73½	41	60	8½	4	4
68	A-540	2500		2550	R	S	EM	Own		48	300	44	73½	41	60	8½	4	4
69	A-550	2500		2900	R	S	EM	Own		36	(11)	45	76	41	64	8½	4	4
70	A-560	1000		1450	R	S	EM	Own		36	300	41	70	34	51½	8	3¾	3
71	A-800	5500		5400	R	S	EM	Own		48	(12)	60	94	44	66½	8	4	4
72	Moto-Truc PPT	650	2½	550	W		EM			12		24	40	27	50			3
73	PPT-R	750	2½	550	R	St	EM			18		30	48	31				3
74	Rocky Mountain BT		5	1060	R	S	EM			(13)		30	77	37	48			3
75	DCT		5	1025	R	St	EM			32		36	77	37	52			3
76	Towmotor K5-30	3000	73	3600	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
77	K5-33	3300	80	3990	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
78	K5-36	3600	88	4260	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
79	K5-40	4000	98	4680	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
80	Yale & Towne K24JS	3000		3100	R	S	E-G	Electric Specialty				39½	67	39½		8½		4
81	K24DT	2000		2650	R	S	E-G	Electric Specialty				42½	72	40½	60	8½		4
82	MT	(14)	4	1470	W		E-G	AL MCP4002	1	12	450	30	48¼	32¾		2¾	2¾	3
83	M5GT	(14)	4	990	W		EM	AL MCP4002	1	12	400	42¼	57⅞	31		1¾	1¾	3

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

TOWING TRACTOR TYPE

A multitude of variations are available from any of the companies listed.

TURNING RADIUS (Ins.)			SPEEDS						GRADABILITY Per Cent			TIRES				
					Unloaded		Loaded					Type		Sizes		
Outside	Inside	Intersecting Aisle	No. of Forward	No. of Reverse	Forward (mph)	Reverse (mph)	Forward (mph)	Reverse (mph)	Unloaded	At Rated Load	Coupler	Steering Wheels	Driving Wheels	Steering Wheels	Driving Wheels	Line Number
90		68	3	3	7.0	7.0	3.5	3.5	47	5						1
63½		63½	3	3	7.0	7.0	3.5	3.5	50	5						2
48		37	3	3	4.8	4.8	2.4	2.4			P	Cu	Cu	10½x5	17x4½	3
37	0	36	3	3	4.8	4.8	2.4	2.4			P	Cu	Cu	10½x5	17x4½	4
60	0	50	4	4	7.2	7.2	4.6	4.6			P	So	So	15x3½	20x5	5
81	30	59	4	4	7.5	7.5	4.8	4.8			P	So	So	20x4	20x5	6
107	46	67	4	4	8.3	8.3	5.7	5.7			P	So	So	20x6	16x4	7
			2	2							AJ	Cu	So	10½x5	10x5	8
			2	2							AJ	Cu	So	10½x5	10x5	9
			2	2							N	So	So	10x5	5½x4½	10
38¼		41	4	4	6.0	6.0	3.3				Un	So	So	10x5	9x4	11
30		48	2	2	2.5	2.5	2.0		24	8	Un	So	So	10x5	9x4	12
38¼		41	4		6.0	6.0	3.3				Un	So	So	10x5	9x4	13
30		48	2	2	2.5	2.5	2.0		24	8	Un	So	So	10x5	9x4	14
164	76	103	4	1	15.0	2.0					Opt	Pn	Pn	7.00/16	8.25/20	15
164	76	103	4	1	15.0	2.0					Opt	Pn	Pn	7.00/16	8.25/20	16
164	76	103	4	1	15.0	2.0					Opt	Pn	Pn	7.00/16	8.25/20	17
164	76	103	4	1	15.0	2.0					Opt	Pn	Pn	7.00/16	8.25/20	18
164	65	114	4	1	11.0	2.0					Opt	Pn	Pn	7.00/16	8.25/20	19
164	65	114	4	1	11.0	2.0					Opt	Pn	Pn	7.00/16	8.25/20	20
101¼	43¼	64⅞	3	1	14.0	4.0					Opt	Pn	Pn	6.00/9	6.00/16	21
101¼	43¼	64⅞	3	1	14.0	4.0					Opt	Pn	Pn	6.00/9	6.00/16	22
101¼	43¼	64⅞	3	1	14.0	4.0					Opt	Pn	Pn	6.00/9	6.00/16	23
101¼	43¼	64⅞	3	1	14.0	4.0					Opt	Pn	Pn	6.00/9	6.00/16	24
118	35	87	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	25
118	35	87	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	26
118	39	82¾	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	7.50/16	27
118	39	82¾	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	7.50/16	28
118	39	82¾	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	7.50/16	29
118	35	87	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	7.50/16	30
118	35	87	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	31
118	35	87	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	32
148	63½	96	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	7.50/16	33
148	63½	96	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	7.50/16	34
166	74	103¾	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	35
166	74	103¾	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	36
166	74	104½	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	37
166	74	104½	4	1	21.0	3.0					Un	Pn	Pn	6.00/9	6.50/16	38
50		41½	1	1	6.5	7.2			20		Opt	Cu	Cu	13x3½x8¼	16½x4x11½	39
62		52	3	1	10.0	2.3			20	3	Opt	Cu	Cu	14x4½x8	21x5x15	40
62		52	3	1	10.0	2.3			20	5	Opt	Cu	Cu	14x4½x8	21x5x15	41
108			3	1	12.8	3.0			14	7	Opt	Pn	Pn	6.00/9	6.00/16	42
118			3	1	12.8	3.0			14	7	Opt	Pn	Pn	6.00/9	7.50/16	43
120			3	1	12.0	2.8			14	8	Opt	Pn	Pn	6.00/9	6.50/16	44
120			3	1	12.0	2.8			14	5	Opt	Pn	Pn	6.00/9	6.50/16	45
127			4	1	16.3	2.7			20		Au	Pn	Pn	7.50/15	8.25/20	46
49		46	4	4	7.0	7.0	4.0	4.0	15	5	Opt	So	So	12x3½	16x4	47
70	13	30	4	4	7.0	7.0	4.0	4.0	15	5	Opt	SCP	SCP	16x4x11	20x4x16	48
98	37	72	4	4	6.0	6.0	5.0	5.0	15	5	Opt	SCP	SCP	15x5x11¼	20x5x16	49
			4	4	6.0	6.0	5.0	5.0	15	5	Opt	SCP	SCP			50
60			4	1	15.0	4.0	6.0	4.0	20	12	H	Pn	Pn	7.50/10	7.50/10	51
51	0	55	Var	Var	12.0	12.0	8.0	8.0	32	9	Un	Cu	Pn	16¼x4	4.00/8	52
71	2½		3	1	10.0	2.0	10.0	2.0			Opt	Cu	Cu	15½x5x10	15½x5x10	53
42⅝			2	2	3.4	3.4	2.8	2.8	15	10	Opt	Cu	So	10½x6	9x5	54
38½			2	2	3.2	3.2	2.6	2.6	15	10	Opt	Cu	So	10½x6	9x5	55
			2	2	3.0	3.0	2.0	2.0			Opt	So	So	10x3	10x3	56
			2	2	3.0	3.0	2.0	2.0			Opt	So	So	10x3	10x3	57
			2	2	3.0	3.0	2.0	2.0			Opt	So	So	10x3	10x3	58
46	3	36	(6)	(6)	5.0	5.0	4.0	4.0	20	10	Opt	Cu	Cu	10½x7	10x7	59
56	6	48	(6)	(6)	5.0	5.0	4.0	4.0	20	10	Opt	Cu	Cu	10½x7	7x5	60
54½			3	1	8.0	2.1	5.1	2.1			Opt	So	Cu	15x5	21x5	61
54½			3	1	8.0	2.1	5.1	2.1			Opt	So	Cu	15x5	21x5	62
120		78	4	1	10.0	2.3	10.0	2.3			Opt	PC	PC	(7)	(9)	63
120		86	4	1	12.5	2.3	10.0	2.3			Opt	Pn	Pn	6.00/9	6.50/16	64
62			3	1	9.0	2.7	5.7	2.7			Opt	PC	PC	(8)	(10)	65
62			3	1	9.0	2.7	5.7	2.7			Opt	PC	PC	(8)	(10)	66
67		62	4	4	6.1	6.1	3.5	3.5			Opt	So	Cu	15x3½	21x5	67
82		57½	4	4	7.4	7.4	3.7	3.7			Opt	So	Cu	15x3½	21x5	68
69		64	4	4	6.3	6.3	3.5	3.5			Opt	Cu	Cu	16¼x4	21x5	69
60½		59	3	3	7.0	7.0	4.0	4.0			Opt	So	So	15x3½	18x4	70
100			4	4	6.5	6.5	3.0	3.0			Opt	Cu	Cu	22x6	22x6	71
34			2	2	3.5	3.5	2.5	2.5			Opt	So	So	9	8	72
40			2	2	4.5	4.5	4.0	4.0			Opt	Cu	Cu	10½	6	73
63		56	4	4	8.0	8.0										74
56		56	3	3	8.0	8.0										75
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	76
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	77
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	78
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	79
76		57	4	4	6.5	6.5	5.5	5.5			Opt	Cu	Cu	16½x5x11¼	21x5x16	80
61½		55	4	4	7.5	7.5	5.5	5.5			Opt	Cu	Cu	18x3½	20x5	81
43¼		43¼	2	2	3.0	3.0	2.0	2.0	10	5	Opt	Cu	Cu	10½x5	10½x5	82
			2	2	3.0	3.0	2.0	2.0	5	3	GT	Cu	Cu	10½x5	10½x5	83

ABBREVIATIONS

*—Including battery.
†—Not including towing eyes.
(1)—250 to 275.
(2)—250 to 450.
(3)—300 to 360.
(4)—200 to 500.
(5)—340 to 500.
(6)—Two standard; three optional.
(7)—6.00/9 or 21x5.
(8)—4.00/8 or 16¼x4.
(9)—7.00/16 or 28x7.
(10)—4.50/12 or 21x5.
(11)—450 to 550.
(12)—550 to 600.
(13)—24 to 32.
(14)—200 to 700.
AJ—Automatic jaw.
AL—Electric Auto-Lite Co.
Au—Automatic.
Bal—Baldor Co.
Chr—Chrysler Corp.
Con—Continental Motors Corp.
Cu—Cushion.
DE—Diesel engine.
E—Eye.
E-G—Electric or gas-electric.
EM—Electric motor.
GE—Gasoline engine.
GT—Grip tow.
H—Hook.
N—No or none.
Opt—Optional.
P—Pin.
PC—Pneumatic or cushion.
Pn—Pneumatic.
R—Rides.
RW—Rides or walks.
S—Sits.
SCP—Solid, cushion or pneumatic.
So—Solid.
St—Stands.
Un—Universal.
Var—Various.
W—Walks.
Wau—Waukesha Motor Co.
Wis—Wisconsin Motor Co.

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

POWERED END-LOADING (STRADDLE) CARRIERS

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Maximum Load Cap. (Lb.)	Load Space* (In.)		Package Size* (In.)		Service Weight (Lb.)	Power Type	Hoist Mechanism	Overall Dimensions (In.)			Frame Length	Wheel Base	Wheels				Turning Radius (In.)				Load Shoes				Bolster Width (Athwart Truck)	Engine**		Trans-mission		Running Speeds (mph)		Line Number
			Inside Height	Inside Width	Width	Height				Length	Height to Top of Steering Wheel	Width			Number Steer	Number Drive	Tire Sizes Front	Tire Sizes Rear	Without Load Inside	Without Load Outside	With Frame-Length Load Inside	With Frame-Length Load Outside	Length (In.)	Width of Face (In.)	Maximum Lift (from Ground)	Shoes Swing? (Yes or No)		Make and Model	Horsepower	Number Speeds Forward	Number Speeds Reverse	Maximum Forward Unloaded	Maximum Forward with Maximum Load	
1	Gerlinger....4MH	14,000	66	57	52	54	10,600	G	RP	150	110	92⅜	142	110	4	2	9.00x20	9.00x20	116	116	116	.....	124	6	28	No	54	Ford....8RNN	100	4	4	25-30	25-30	1
2	.....SMH	14,000	66	57	52	54	11,100	G	RP	.....	115	86	168	136	4	2	9.00x20	9.00x20	138	138	138	.....	96	6	16	Yes	54	Ford....8RNN	100	4	4	25-30	25-30	2
3	.....RM-20	20,000	70	57	52	58	11,750	G	RP	150	122	92⅜	142	110	4	2	9.00x20	9.00x20	116	116	116	.....	124	6	28	No	54	Ford....8RNN	100	4	4	25-30	25-30	3
4	.....SM-20	20,000	70	57	52	58	12,000	G	RP	176	119	86	168	136	4	2	9.00x20	9.00x20	138	138	138	.....	96	6	16	Yes	54	Ford....8RNN	100	4	4	25-30	25-30	4
5	.....4H	30,000	78	69	64	66	14,300	G	RP	173	132	111½	162	130	4	2	11.00x20	11.00x20	143	.....	143	.....	140	6	26	No	66	Her.....JXD	110	4	4	30-35	30-35	5
6	.....SRH	30,000	78	69	64	66	15,100	G	RP	187	130	106	176	144	4	2	11.00x20	11.00x20	162	.....	162	.....	99	6	16	Yes	66	Her.....JXD	110	4	4	30-35	30-35	6
7	.....(Pivot Fork) PF-20	20,000	78	69	64	66	16,600	G	RP	187	130	106	176	144	4	2	11.00x20	11.00x20	162	162	162	.....	***	....	16	Yes	No B.	Her.....JXD	110	4	4	30-35	30-35	7
8	Hyster.....M3	18,000	81	45	64	66	9,850	G	C	176	107	78¾	160	136	4	2	9.00x20	9.00x20	122	209	147	234	95	5¼	21†	Yes	42	Inter .GRD-214	82.8	4	4	35	35	8
9	.....MH3	30,000	79¼	45	100	108	12,000	G	C	191	117¾	79	173½	148	4	2	11.00x20	11.00x20	161	260	161	260	102	5¼	22†	Yes	42	Inter...BD-269	101	5	5	35	35	9
10	.....MH5	30,000	77¼	68	64	66	15,150	G	C	202	129¾	99½	173½	148	4	2	11.00x20	11.00x20	161	260	161	260	94¾	5¼	22†	Yes	42	Inter...BD-269	101	5	5	35	35	10
11	Ross Div. (Clark).....70-6657	10,000	66	57	52	54	7,200	G	H	130	101	86	.....	76	2	2	7.50x15	9.00x20	76	180	76	180	99	6	12	No	54	Cont.....6 cyl.	65	2	2	25	25	11
12	81-7256	20,000	72	56	52	60	10,300	G	H	180	114	90	.....	138	4	2	10.00x20	10.00x20	127	228	127	228	94	6	18	Yes	54	Her.....6 cyl.†	80	4	4	40	40	12
13	91-7056	30,000	70	56	52	58	12,600	G	MC	187	115	92	.....	144	4	2	11.00x20	11.00x20	142	252	142	252	99	6	21	Yes	54	Her.....6 cyl.	110 or 140	4	4	40	40	13
14	95-7256	35,000	72	56	52	60	16,650	G or D	Hyd	200	117	94	.....	156	4	2	11.00x20	11.00x20	.....	.....	.....	.....	108	6	21	Yes	54	Her.....6 cyl.	140	4	4	35	35	14
15	99-14498	30,000	144	98	84	123	23,700	G	MC	200	198	149	.....	146	4	2	14.00x24	14.00x24	.....	.....	.....	.....	204	6	40	Yes	96	Her.....6 cyl.	140	4	4	25	25	15
16	100-7262	45,000	72	62	58	60	20,300	G or D	Hyd	210	117	107	.....	162	4	2	12.00x20	12.00x20	122	252	122	252	114	6	25	Yes	60	Her.....6 cyl.	140	4	4	30	30	16

For Names and Addresses of Manufacturers of Equipment Described on These Pages, See DA, Feb., 1954, Pages 64 to 115

SYMBOLS

* All manufacturers listed have indicated that load space and package size can be manufactured to customer's specifications

** All engines used in these models are water cooled

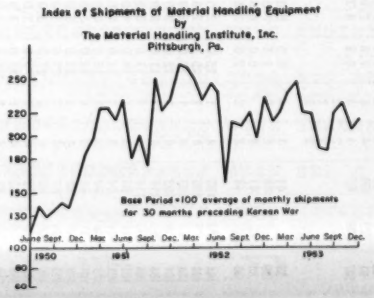
*** 2½ by 6 by 38

† This model also available with Ford V-8 engine in 130 hp

ABBREVIATIONS

C—Chain
Cont—Continental
D—Diesel
G—Gas
GorD—Gas or Diesel
H—Hydraulic
Her—Hercules
Inter—International
MC—Mechanical Chain
NoB—No Bolster
RP—Rack Pinion

Materials Handling Index



MH Index Drops 11 Points in Fourth Quarter: The fourth quarter index of shipments of MH equipment, as compiled by MHI, indicates that 1953 fell 11 points below 1952, from 227 to 216. The index, based on a 30-month period, includes reports from manufacturers of fork trucks and accessories, conveyors, strapping, hoists, cranes, monorails, pallets, containers, tote boxes, casters and other wheeled MH equipment. The total dollar figure from which the index is computed is more than 25 per cent of the annual total for the industry

Warehouse SPOTLIGHT

Men in the Spotlight

Elmer Erickson—elected chairman of the board, and **Melville B. Bowen**—new president and general manager, Midland Warehouses, Inc., Chicago, Ill.

Arthur J. Weber—appointed vice president and general manager, Mead Johnson Terminal Corp., Evansville, Ind. **V. H. Juncker**—new secretary-treasurer and operations manager.

V. P. Morton—re-elected president, Massachusetts Warehousemen's Assn.

H. W. Danskin—new secretary, Oregon Draymen and Warehousemen's Assn.

John Doggett—elected president, Houston Warehouse and Transfermen's Assn.

G. Evan Reely—uncontested nominee for Montana governor of Rotary International.

Malcolm A. Keyser—died March 1. He was president of Keyser Moving and Storage Co., Salt Lake City, Utah.

George W. DuBois—new manager, Minneapolis Terminal Warehouse Co., Minneapolis, Minn.

Martin B. Holt, district manager, Bekins Van & Storage Co., Oakland, Cal.—elected president, Draymen's Assn. of Alameda County, Cal.

Herman F. Bloechel, controller and assistant treasurer, North American Van Lines, Inc., Fort Wayne, Ind.—elected to membership in the Controllers Institute of America.

Joseph L. Corcoran, president, Evanston Fireproof Warehouse, Evanston, Ill.—selected the "Best Boss of the Year" by the Evanston Junior Chamber of Commerce.

George R. Wachter—elected vice president and general sales manager, Freezing Equipment Sales, Inc., York, Pa.

James A. McConnell, Ithaca, N. Y.—named to succeed Howard H. Gordon as Administrator of the Commodity Stabilization Service.

Robert C. Greeley, Greeley General Warehouse Co., Cleveland, Ohio—re-elected president, Ohio Warehousemen's Assn.

William F. Goines, Jr.—officially appointed district manager of Bekins-San Francisco, Cal.

—DA—

Convention Speakers

Speakers scheduled to address the Canadian Warehousemen's Assn. Convention May 17-20 include: W. Dent Smith, Terminal Warehouses, Ltd., Toronto; Hon. James G. Gardiner, Canadian minister of agriculture; C. P. Lentz and Dr. W. H. Cook, members of the National Research Council in Ottawa and J. Leo Cooke, J. Leo Cooke Warehouses, Jersey City, N. J.

—DA—

New Warehouses

D. H. Overmyer Warehouse Co. announces opening of a new public merchandise warehouse in Jacksonville, Fla., at 502 E. Bay St. It contains approximately 50,000 sq ft of space, and has a six-car siding on the Southern RR. Samuel Cox has been appointed manager.

Pictsweet Foods, Inc., Mt. Vernon, Wash., is planning a large modern freezing plant at San Jose, Cal. The new plant will provide production capacity of about 35 million pounds, with provision made for future expansion.

Warehouse Doubles Capacity

Large Mid-Western Grocery Chain Doubles Warehouse Capacity With Multiple-Tier Racks: (Above) Before installation of Multi-A-Frame Racks. (Below) After installation of racks made by Ainsworth Manufacturing Corp., number of aisles was reduced, 3-tier storage arrangement saved time and effort required to load, unload, select and transport merchandise

1954 Assembly of the Movers' Conference of America will be held in Boston, Mass., Aug. 1-3.

Accident Free

California Transfer and Storage Firm Gets Safety Award: Pictured above (left to right) are Sgt. Fred Chourret, California Highway Patrol; Sidney Vandervoort, president of Palo Alto Transfer and Storage Co., and William Hydie, Palo Alto chief of police. The highway officials presented two special awards—for pick-up and delivery and long line operations — accident free during the first six months of 1953, to Vandervoort's firm

BIRMINGHAM, ALA.

1880—Seventy-four Years of Service—1954

HARRIS TRANSFER & WAREHOUSE CO.

• South 13th St., Birmingham •

Merchandise and Household Goods

• STORAGE • CARTAGE • DISTRIBUTION • FORWARDING

Pool Cars Handled

Member of A.C.W.—A.W.A.—N.F.W.A. Agents for Allied Van Lines, Inc.

BIRMINGHAM, ALA.

Over 125,000 Sq. Ft.

THOMAS N. NELSON & CO., Inc.

1000 North 16th St. 53-2468 2301 First Ave. No. 54-4591

TWO WAREHOUSES CENTRALLY LOCATED FOR

MANUFACTURERS & WHOLESALE GROCERS

Warehousing Local Drayage

* Represented by CHICAGO 4 324 S. MICHIGAN AVE. WA bash 2-2367 ALLIED DISTRIBUTION INC. NEW YORK 19 70 WEST 42ND ST. PE nn 6-0967

Pool Car Distribution

BIRMINGHAM, ALA.

For Dependable Service—

SHAW WAREHOUSE COMPANY

115 SOUTH 35TH STREET

BIRMINGHAM, ALA.

STRICKLAND TRANSFER & WAREHOUSE CO.

112 South 14th St., Birmingham

General Merchandise Storage and Distribution

Pool Car Service a Specialty—Motor Truck Service

Centrally Located—Free Switching from All R.R.s

DOTHAN, ALA.

SECURITY BONDED WAREHOUSE

500-501 East Commerce Street

POOL CAR DISTRIBUTION

SERVING
S.E. Alabama
S.W. Georgia
N.W. Florida

Receiving—STORAGE—Handling.
Motor Freight Service to all points.
6-car Private Siding. Reciprocal Switching.
Efficient—Conscientious Branch House Service.

PHOENIX, ARIZ.

Telephone: ALpine 4-2566 Teletype PX 263

KUNKLE TRANSFER and STORAGE

324 S. Second Ave., Phoenix, Arizona

"PERSONALIZED SERVICE"

DISTRIBUTION • STORAGE • DRAYAGE

SANTA FE & SO. PAC. SIDINGS

TUCSON, ARIZ.

Telephone 2-3331

TUCSON WAREHOUSE & TRANSFER CO.

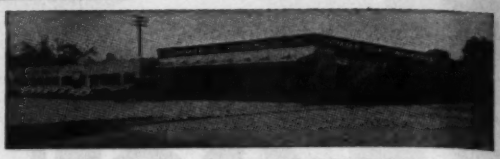
110 E. 6th St., Tucson, Ariz.

Storage—Warehousing—Distribution—Packing

59,000 sq. ft. in Tucson—Served by Rail-Motor Truck. Modern fleet of trucks from 1-60 Tons for distribution in Tucson and vicinity. Crane and Winch service for heavy lifts.

LITTLE ROCK, ARK.

New one story 90,000 sq. ft. warehouse



COMMERCIAL WAREHOUSE CO.

This ultra modern warehouse property with six car siding on the Rock Island is completely mechanized. We offer general merchandise warehousing at its best, including pool car distribution, office and display facilities and loans on stored commodities.

300-324 RECTOR STREET **LITTLE ROCK, ARK.**

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ARKANSAS LARGEST WAREHOUSE

Merchandise and Household Storage

FIREPROOF-CONSTRUCTED

Pool Car Distribution—Agent, Allied Van Lines

TERMINAL WAREHOUSE CO.

Member American Warehousemen's Association

American Chain of Warehouses

LITTLE ROCK ARKANSAS

LOS ANGELES, CAL.

Operating Warehouses Throughout the West

BEKINS

Since 1893

VAN AND STORAGE CO.

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W. C. Elliott, Manager

LOS ANGELES, CAL.

MEMBER OF A.W.A.

PACIFIC COAST TERMINAL WAREHOUSE COMPANY

4802 LOMA VISTA AVE. LOS ANGELES 58

MERCHANDISE STORAGE AND DISTRIBUTION

Located in the heart of the Wholesale District

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923 E. 3rd St. Los Angeles 13, Cal.

GENERAL MERCHANDISE STORAGE

POOL CAR DISTRIBUTION STORAGE IN TRANSIT

DAILY HARBOR, LOCAL AND STATEWIDE HAULING

EXPERIENCED, EFFICIENT, BONDED PERSONNEL

10 Car Siding on A.T.&S.F. Railway

Sprinklered—A.D.T. Protected

LOS ANGELES, CAL.

REPUBLIC VAN & STORAGE CO., INC.

WAREHOUSING—DISTRIBUTING—CARTAGE

147,000 sq. ft. in downtown L. A., 9 car switch covered dock—small blocks of space for lease.

COAST TO COAST VAN SERVICE

214 No. Alameda

Export Packing & Crating Tucker 6101

ST. LOUIS, MO.

ST. LOUIS TERMINAL WAREHOUSE CO and MID-WEST TERMINAL WAREHOUSE CO.
SERVICE THAT EXCELS

"Serving Industry for twenty-six years"

OVER 1,000,000 Sq. Ft. of WAREHOUSE Space

Located right in the midst of business

Plus

FAST and EFFICIENT DISTRIBUTION in the ST. LOUIS AREA

Complete Facilities

AMERICAN CHAIN OF WAREHOUSES OFFICIAL SEAL STORAGE

Pool car distribution
Reforwarding storage in transit
A.D.T. Alarms and sprinkler systems
Traffic and legal depts. Bonded employees

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53 West Jackson (4)
Harrison 7-3688

NEW YORK OFFICE
250 Park Avenue (17)
Plaza 3-1235

Member AMERICAN WAREHOUSEMEN'S ASSOCIATION

LINCOLN, NEBR.

SULLIVAN S
ESTABLISHED 1889

MERCHANDISE STORAGE AND DISTRIBUTION

POOL CAR DISTRIBUTION

Excellent Storage IN TRANSIT POINT

RIGGING, HEAVY HAULING, MOVING, PACKING, STORING

Fleet of 40 Trucks

Represented by Allied Distribution Agent—Aero Mayflower Transit Co.
Member—American Warehouseman's Ass'n.

SULLIVAN S
ESTABLISHED 1889

301 North 8th St. LINCOLN, NEBR.

311 W. 4th St. GRAND ISLAND, NEBR.

ST. LOUIS, MO.

Established 1912

NOTICE—To Traffic Managers

We specialize in storage of candies in our new automatic temperature and humidity controlled rooms.

As well as general warehousing and cold storage—also pool car distribution and forwarding—Insurance 16.2c. per $100.00.

Tyler Warehouse & Cold Storage Co.
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Members: A.W.A.—Mo.W.A.—St.L.M.W.A.
St. Louis Chamber of Commerce

OMAHA, NEBR.

WAREHOUSING and DISTRIBUTION

DEPENDABLE

FAST, EFFICIENT MERCHANDISE WAREHOUSING

Completely mechanized with Fork Lifts, Conveyors, Pallet Racks, and Pallet Exchange. Specializing in merchandise distribution, cartage service. 2 major railroad sidings — UP and CB&Q.

COMPLETE BRANCH HOUSE SERVICE

ALGER WAREHOUSE Co.
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Member of Interlake Terminals, Inc.

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Agent: ALLIED VAN LINES, Inc.

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MERCHANDISE AND HOUSEHOLD GOODS STORAGE
POOL CAR DISTRIBUTION
We Specialize in Transit Storage
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STORAGE WAREHOUSES, INC.

"Satisfactory Service Since 1887"
Agt. Allied Van Lines, Inc.
Modern sprinklered whse on trackage
Mdse. Stge. & complete Dist. service
Member of A.W.A. & N.F.W.A.

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STORAGE & MOVING COMPANY

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Omaha's most modern, centrally located warehouse. Fireproof construction—Fully sprinklered—Low insurance. Sidings on I.C. R.R. and U.P. R.R. U. S. Customs Bond. General Merchandise—Cooler Storage—Household Goods Storage. Also operate modern facilities in Council Bluffs, Iowa. Our own fleet of trucks for quick deliveries.

Member of N. F. W. A. and A. W. A.

a Representative of ALLIED DISTRIBUTION INC.
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NEW YORK 19 — 11 WEST 42ND ST — PLaza 7-2967

MANCHESTER, N. H.

Make Our Warehouse Your Branch Office for Complete Service in New Hampshire

NASHUA, N. H.
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McLANE & TAYLOR
Bonded Storage Warehouses
Offices 624 Willow St.

"Crating Furniture Our Specialty"

General Merchandise Storage and Distribution, Household Goods Storage, Cold Storage, Unexcelled Facilities. Pool Car Distribution Direct R. R. Siding, Boston & Maine R. R.

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Lehigh Warehouse & Transportation Co.

Established 1934 — *Incorporated*
Ralph Memoli, *Manager* — 963 Newark Ave. *Tel.—Market 3-1830*

FACILITIES—500,000 sq. ft. Reinf. concrete & Steel. Flr. ld. 250 lbs. Fireproof. Auto. Fire & Burg.—ADT. Ins. $.167. Siding PRR. 30 cars. Shelt. plat. 20 trks. SERVICE FEATURES—Pool car dist. Co. oper. cartage serv. 52 trks. Off. & Stge. space for lease. Spec. in hdlng. lge. machinery & steel in lifts up to 4½ tons, 1 pttl. Stt. Con.; Fagr. Type Elev.; Frt. Plat. Elev.; 5 Pttl. Trg. Mach.; 4 Elev. Plat. Trk.; 40 Plat. tk.
MEMBER—A.W.A.; N.J. Mtr. Trk. Assoc.; Whse. Assoc. of N. Y.

JERSEY CITY, N. J.

J. LEO COOKE WAREHOUSE CORP.

140 BAY ST., JERSEY CITY 2, N. J.
Telephone (NY) Whitehall 3-5090-1-2
(NJ) Journal Square 2-5080-1-2-3
J. Leo Cooke, *President* — Frank E. Kearney, *Vice President—Sales*
Established 1949. Investment over $200,000.
FACILITIES—300,000 sq. ft. reinf. cons. and steel. Low ins. rate, watchman serv. Fl. Ld. 250 lbs. Siding Pennsylvania RR. Also Erie RR., 12th & Provost Sts., Jersey City. Shelt. plat. Spec. in food and products requiring protection from dampness, dirt, heat or cold. Mod. mat. handling. Palletized. Eastern rep.: North Pier Terminal Co., Chicago; National Terminals Corp., Cleveland; Indiana Terminal & Refrigerating Co., Indianapolis. Member—A.W.A.—Can. W.A.

JERSEY CITY, N. J.

Lackawanna Warehouse Company

Established 1940 — *Incorporated*
I. A. Miller, Manager — 629 Grove St.
Tel.—(N.J.) Journal Sq. 2-3360, *(N.Y.) Rector 2-2345*
FACILITIES—1,072,883 sq. ft. Reinf. concrete & steel. Fireproof. Fire & burg.—ADT Int. $.06. Siding D.L.&W. RR. 52 cars. Shelt. plat., 54 trucks. Ceiling hgt. 8½ ft. Elev. cap. 12,000 lbs.
SERVICE FEATURES—Pool car dist. Stge. & off. space for lease. Co. oper. cartage serv. 52 trks. SIT arrangements. 24 trl. plat. elev.; etc.
MEMBER—A.W.A.; N. J. Motor Truck Assoc.; Whse. Assoc. Port of N.Y.A.

JERSEY CITY, N. J. — In the New York-New Jersey Metropolitan Areas

WAREHOUSING—TRUCKING—DISTRIBUTION

Storage in Transit — Local-Export-Import — Pool Cars-Pool Truckload
12 car L.V. RR covered siding—45 truck Loading Dock, enclosed—Mechanized Equipment—Palletized—Packing—Crating—Shipping.
REFRIGERATED TEMPERATURE CONTROLLED ROOMS—LIQUOR LICENSE

NORTH JERSEY WAREHOUSE COMPANY, INC.

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N. Y. Phone: Whitehall 3-1587 — TWX Service - JCy 3972 — N. J. Phone: HEnderson 2-4272

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"TOPS IN NEW JERSEY"

18 floors of modern fireproof, sprinklered warehouse space. 250,000 square feet, low insurance rates, centrally located in downtown Newark.

GENERAL MERCHANDISE *stored, distributed*

HOUSEHOLD GOODS *packed, moved, stored or shipped ANYWHERE in U. S. or abroad.*

FEDERAL STORAGE WAREHOUSES

155 WASHINGTON ST • NEWARK 2, NEW JERSEY

NEWARK, N. J.

Lehigh Warehouse & Transportation Co.

Established 1919 — *Incorporated*
A. F. Christiano, *Manager* — 98 Frelinghuysen Ave. *Tel.—(N.J.) Bigelow 3-7200 (N.Y.) Rector 2-3338*
FACILITIES—250,000 sq. ft. Reinf. concrete & Steel. Fireproof. Auto. Fire & Burg. —ADT. Ins. $.064 Flr. ld. 250 lbs. Siding Lehigh Valley, 15 cars. Recip. switch with PRR. Shelt. plat. 20 trks.
SERVICE FEATURES—Co. oper. cartage, 52 trks. Spec. in food, liquors, also. apples. 2 grav. rol. con.; 8 frt. elev.; 120 plat. tk.; 14 hand tk.
MEMBER—A.W.A.; N.I. Motor Trk. Assoc.; Whse. Assoc. N. Y.

PORT NEWARK, N. J.

Lehigh Warehouse & Transportation Co. Inc.

Agents for the Port of New York Authority
Established 1948 — *Building 5*
R. Memoli, *Manager* — Foot of Doremus Ave. *Tel.—Market 3-7463*
FACILITIES—200,000 sq. ft. Reinf. concrete & steel. Fireproof. Sprinkler sys. watchman ADT supervised. Private RR siding 13 cars PRR, CNJ, LV, shelt. plat., 30 trks. Deep water berth to 35'.
SERVICE FEATURES—U. S. Customs bonded. 2—25 ton cranes. S.I.T. Pool Car dist. Co. oper. cartage serv. 52 trks.
MEMBER—A.W.A.; N.J. Motor Trk. Ass'n; Whse. Ass'n N.Y.

. . . Refrigerated Warehousing

(Continued from Page 29)

operation and extend the working day. Space still was an important factor.

Greater tonnage per day handled and faster service was the result but the tonnage handled per man hour decreased. This was occasioned by labor gearing itself to a pace that would enable men to work the extended day. It caused many inefficient operations—and was the beginning of many bad habits.

When the war ended and warehousemen tried to return to their prewar operations, they faced labor's reluctance to speed up from the wartime pace and accept a smaller pay envelope. Labor demanded more money without increased production.

The refrigerated warehouse industry had to review its operations with the hope of meeting increased cost with a better method of handling. The industry explored the possibilities of a palletized system which proved successful in government installations during the war.

This pallet truck is used on mezzanine, where floor capacity will not permit use of a standard fork truck

This system was designed to decrease handlings and enable labor to handle more freight, faster and safer than ever before. However, such a system used more space for operating than hand operated systems — and space was still valuable with the increased demands of the frozen food industry.

Growing Pains

Would it be economically sound to sacrifice space for better utilization of manpower and speedy handling? Could powered handling equipment, fitted into buildings that were built around a hand operation, operate efficiently? These were problems that had to be answered. The increased demands for faster service and higher labor costs forced the decision of mechanization wherever possible.

Many refrigerated warehouses could not change to a complete palletized-fork truck system because of the buildings limitations. Warehousemen did realize that the savings in a system which stressed less handlings would be increased production. Many who were unable to use fork trucks for stacking moved the pallet load to storage by means of pallet jacks, and hand stacked the remaining space. Buildings were altered in many ways to allow the use of machines.

(*Please Turn to Page* 154)

HOUSTON, TEXAS

BENJ. S. HURWITZ, Pres.

WESTHEIMER
Transfer and Storage Co., Inc.
2205 McKinney Ave., Houston 1
Since 1883
Merchandise & Household Goods Storage—Pool Car Distribution—Lift Van Service—20 car lengths of trackage.
Warehouses—A.D.T. Automatic Fire and Burglary Protection
Agent for Allied Van Lines, Inc.
Members N.F.W.A. State and Local Assn.

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Gillis-Hood Terminal Warehouses, Inc.
(Formerly Muegge-Jessell Warehouse Co.)
1432-34 So. Alamo St., San Antonio 7
P. O. BOX 4415, STA. A
Merchandise Storage and Distribution
Private Siding. Free Switching
Member of SWA

SAN ANTONIO, TEXAS

Merchandise **MERCHANTS** Household Goods
TRANSFER & STORAGE CO.
Merchants & Transfer Sts., San Antonio 6
Complete Storage and Distribution Service
Over 50 years of satisfactory service
Member of A.W.A.—N.F.W.A.—S.W.A.

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Agent for Allied Van Lines, Inc.
Scobey Fireproof Storage Co.
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HOUSEHOLD — MERCHANDISE — COLD STORAGE—CARTAGE DISTRIBUTION
INSURANCE RATE - - - 10c
Member of 4 Leading Associations

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Security Bonded Warehousing Co.
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Merchandise Storage and Distribution
Private Siding—Free Switching
Member of SWA—SAMC

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MEMBER
SOUTHERN TRANSFER & STORAGE CO.
P. O. BOX 4097, STA. A, SAN ANTONIO 7
Specialists in Merchandise Distribution
FIREPROOF CONSTRUCTION
BONDED STORAGE
Represented by
CHICAGO 4 — ALLIED DISTRIBUTION INC. — NEW YORK 19

WICHITA FALLS, TEXAS

POOL CAR DISTRIBUTION
Since 1920
Spot stocks of Grocer Lines a Specialty
TARRY WAREHOUSE & STORAGE CO.
Wichita Falls, Texas
Members: SW&TA—NFWA—AVL

OGDEN, UTAH

MEMBER OF A.W.A.
WESTERN GATEWAY STORAGE CO.
GENERAL WAREHOUSING
POOL CAR DISTRIBUTION
MERCHANDISE AND COLD STORAGE

SALT LAKE CITY, UTAH

CENTRAL WAREHOUSE
520 West 2nd South St., Salt Lake City 1
Fireproof *Sprinklered*
Merchandise Storage
Pool Car Distribution Office Facilities
Member A.W.A.

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Household • Automobile Storage • Merchandise
NEW-BELL STORAGE CORPORATION
22nd St. & Monticello Ave.
NORFOLK 10, VIRGINIA
MODERN SPRINKLER EQUIPPED WAREHOUSE
50,000 SQUARE FEET PRIVATE RAIL SIDING
Lowest Insurance Rate in Norfolk. Pool Car Distribution
WE SPECIALIZE IN MERCHANDISE STORAGE AND DISTRIBUTION
AGENTS AERO MAYFLOWER TRANSIT COMPANY
Member M.W.A. & A.T.A.

NORFOLK, VA.

Fine Warehousing Since 1914
Security Storage and Van Co.
500-530 FRONT STREET
COLLECTIONS • POOL CARS • DISTRIBUTION
MOTOR VAN AND LIFT VAN SERVICE
Member—Nat'l. F.W.A.—Allied Van Lines

NORFOLK, VA. Established 1892

SOUTHGATE
STORAGE COMPANY
239 Tazewell St., Norfolk 10

MEMBER: A.C.W. A.W.A. S.W.A. U.S.C. of C.

For economical storage and distribution you will want to know more about our individualized services. Our fireproof warehouses are in the Southgate Terminal, on the waterfront and in the center of Norfolk's wholesale district. Served by all rail, water and motor lines.

Write for Booklet—"7 POINT DISTRIBUTION"

RICHMOND, VA.

76 Years of Uninterrupted and Expert Service
BROOKS TRANSFER & STORAGE CO., Inc.
1224 W. Broad St., Richmond, Va.

MERCHANDISE Warehousing and distribution. Private railroad siding. Pool car distribution. Freight truck line.

HOUSEHOLD GOODS stored, packed and shipped. Motor van service to all states.

MOVING WITH CARE United EVERYWHERE

- 810,000 cu. ft. storage space
- Three storage warehouses
- Low insurance rates

RICHMOND, VA.

VIRGINIA BONDED
WAREHOUSE & TRANSPORTATION CO.
1709 East Cary Street—Richmond, Va.
Storage space 160,000 square feet, completely modernized. Mechanized materials handling equipment. 8-car siding Southern Railway. 8-truck platform. Pool car distribution. Lehigh cartage services. Sprinkler protected; ADT Watchman controlled.
OPERATED BY **LEHIGH** WAREHOUSE & TRANSPORTATION CO.
NEWARK • JERSEY CITY • BROOKLYN • ELIZABETH • PORT NEWARK • RICHMOND, VA.

ROANOKE, VA.
Agent: Allied Van Lines, Inc.
PITZER TRANSFER, STORAGE & FUEL CORP.
403-411 W. Salem Ave., Roanoke 5
Capacity 500 Cars
Private RR Siding
Automatic Sprinkler
Accurate Accounting
We make a specialty of Storage and Pool Car Distribution for Agents, Brokers and General Merchandise Houses.
Represented by: American Chain of Warehouses, Inc.

SEATTLE, WASH.
Announcing expanded service
SEATTLE TRANSFER CO.
2250 Occidental Avenue
Lloyd Transfer Co. — Pool Car Division
Standard Warehouse Co. — Storage Division
Affiliated with:
PACIFIC NORTHWEST WAREHOUSES, Inc.
Portland Eugene Klamath Falls Medford Salem
Seattle Spokane Tacoma Bellingham
Boise Butte

SEATTLE, WASH.
EYRES TRANSFER & WAREHOUSE CO.
2203 First Ave., So., Seattle 4
Cartage — Distribution — Storage
Highest financial rating; new fireproof, A.D.T. sprinklered buildings; lowest insurance rate (10.2c); modern equipment.

SEATTLE, WASH.
Lloyd X. Cedar, Pres. Ellis L. Cedar, Secy.-Treas.
SYSTEM Transfer & Storage Co.
Established 1919
2601-11 Second Avenue, Seattle 1
Complete Drayage, Storage and Distribution Service
"System Service Satisfies"
Member—A.W.A.—W.S.W.A.—S.T.O.A.

SEATTLE, WASH.
Seattle's One-Stop Warehousing Service!
Merchandise Storage
Distribution and Cartage
SEATTLE TERMINALS, Inc.
Executive Offices: 3440 E. Marginal Way, Seattle 4

SEATTLE, WASH.
TAYLOR-EDWARDS
WAREHOUSE & TRANSFER CO., INC.
1020 Fourth Avenue South — Seattle 4
WAREHOUSING • DISTRIBUTION • TRUCKING
Represented By
DISTRIBUTION SERVICE, INC.
New York—Chicago—San Francisco

. . . Refrigerated Warehousing

(Continued from Page 142)

As the need for additional space increased, new warehouses were built. They were built with handling speed in mind. All the obstacles of the old multi-story building were overcome on the drafting board.

Many warehouses were built outside metropolitan areas, where trailer-trucks could maneuver with ease—single story buildings with almost unlimited floor loads . . . high storage areas . . . clearances between columns based on the size of units to be handled, wide doorways, and an abundance of shipping doors.

Operators of these new buildings believed they now had facilities and tools to increase man-hour production, with less effort, faster and safer. Compared to some of the old operations, they were a "warehouseman's dream."

New Space Problems

Refrigerated warehousing customers have enjoyed the operation of these new single storied warehouses for the past six years, but new problems are coming up that may change the planning of future warehouses. The industry sacrificed space to gain better and faster handling. Now they are again thinking of better utilization of space as a problem to be solved.

Most of these new buildings have been handling and storing frozen foods, that, in most cases, stack well and are in large quantities. But as the frozen foods increase, new items are being offered for storage.

Sizes of many of the containers have decreased. Quantities usually received in car load lots, now are received in truck lots or less. Small lots, items that cannot be stacked to great heights and smaller containers, are causing a problem to operators of single-story warehouses.

Some are using box pallets or racks which cost money to build and maintain. They also take additional time in loading and unloading and less tonnage per square foot of space is being realized. One warehouse built a mezzanine floor to handle single pallet load lots or items that would not stack well in high storage areas. This helped until the demand for this type space increased and the space ran out.

Operators of single-story warehouses are finding out that it cost more time and money to pick orders of less than a pallet load than it does a full pallet load. Picking an order of less than a pallet load from pallets that are stocked 16 to 24 ft high is a problem that can only be overcome by additonal equipment and men.

Lost Space—Slower Handling

Results of these new problems are lost space and slower handling. Perhaps the solution can be found in new construction, when needed. A modified multi-story warehouse no more than three stories high, with stacking heights limited to two pallets high, would answer some of the problems.

Rows of stacks not greater than four pallets deep leaving off the top pallet next to the aisle would enable faster picking, and when machines were not available, orders could be picked by a man and wagon or a pallet jack. This would overcome the problem of items that cannot stack more than two pallets high.

There could be an assembly area on each floor to pick orders ahead of time. It is true that space of additional aisles caused by smaller rows of stacks would be the result but, with new types of stacking equipment, aisles could be held to the maximum of 7 ft with a 48-in. pallet instead of the 12 to 14 ft size now used in most single story warehouses.

Elevators that always have been considered bottle necks to a continuous operation in a multi-story building could be revised to a speedy operation. It is always the claim, that elevators stop a continuous operation because there are not enough of them, or they are not large enough.

However, if in a palletized system the size of the elevators were only large enough to handle one pallet, with two equal-size elevators side by side, there would not be a stop in the operation with one being loaded and the other being emptied. The problem of elevators could be overcome.

Selected Storage

Commodities received in large quantities and shipped in large quantities could still be stored in bulk areas, and fast moving items of small quantities and crushable items would be reserved for the multi-story addition.

It is known that some day the unit-load will not start at the warehouse platform, but at the point where the product is first handled. New construction will have this in mind. When the need for greater speed and greater savings are paramount this unit load system will be expanded.•

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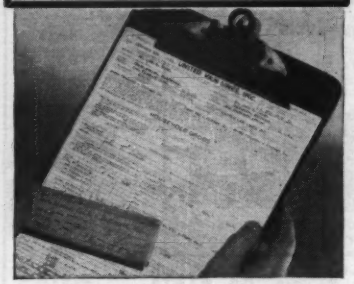

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a willingness to answer queries and supply literature on their products. The American Standards Association has formed a committee to study and develop American Standards for Pallets. Information can be obtained by writing ASA at 70 E. 45 St., New York 17, N. Y.—Ed.

(Resume Reading on Page 16)

Proposed legislation designed to eliminate current rate-cutting practices in the transportation of dry-bulk commodities on the barge lines operating on the Mississippi and Ohio river systems April 7 received the strong backing of the ICC.

—DA—

ICC Commissioner James K. Knudson announced April 13 that he was completing arrangements to form a law partnership with S. S. Eisen, New York, N. Y. Knudson notified President Eisenhower in March that he is resigning his position with the ICC and as DTA administrator.

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